



CANNING AND PRESERVING FOR PREPPERS

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TYLER GORDON

DEHYDRATING COOKBOOK FOR PREPPERS

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The Prepper's Canning & Preserving Bible

5 Books in 1

*THE COMPLETE GUIDE TO WATER & PRESSURE CANNING,
DEHYDRATING, FERMENTING AND PICKLING FOOD.
EASY RECIPES TO SURVIVE AFTER THE SOCIETY COLLAPSE*

Tyler Gordon

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Introduction

Canning is a method of preserving foods by processing them in an airtight container. Canning foods goes back to the early 1800s when a French confectioner and brewer noticed that his foods did not spoil when cooked inside a sealed jar. From there, canning took off and became the most popular and effective way to preserve and store foods.

When foods are canned, their shelf life increases, making a perishable food safe to consume for about one to five years, depending on the food. It is a perfect way to preserve food if you have an abundance and do not want it to spoil. It is also a great method of storing food and preparing foods in advance.

Welcome to the world of home canning! Whether you have recently become interested in canning or have always wanted to learn how to can foods, this book is for you. You will learn about all the tools needed to can, the step-by-step process of how to can a wide variety of foods, and the safety guidelines to help you produce delicious and protected foods. By the end of this book, you will be able to can everything!

BOOK 1: CANNING AND PRESERVING FOR PREPPERS

Chapter 1: Understanding Canning and Preserving

History of Canning

Since longer prehistoric times, humans have tried to develop a new technique to keep their food last longer. At that time, they develop various methods like pickling, drying, salting, and smoking food to keep their food lasts for a long time.

Canning is one of the most popular methods that help to preserve food for a long time. The food is processed and packed into airtight containers which help to increase the shelf life typically from 1 to 5 years and in some circumstances, it is preserved for a very long time. For example, canned dried lentils are found in the edible state after 30 years of a long time.

During the period of Napoleonic war (1803) Napoleon Bonaparte realizes that his soldiers were starving due to lack of fresh food because fresh foods are decaying during the war period. To find the permanent solution on food preservation Napoleon Bonaparte offered a reward of 12000-franc to those who find the cheap and continent way to preserve a large amount of food for his army and navy soldiers.

Nicolas Appert is young chief accepted this challenge and doing long research over food preservation and finally, in 1809 he found that the food cooked inside the sealed jar did not spoil for a very long period of time unless the jar seal was leaked, and food is exposed with oxygen. In Nicolas Appert method of a jar, sealing allows preserving soups, vegetables, dairy products, fruits, juices, syrup, and jellies. In 1810 French minister awarded Nicolas Appert for his experiment. Before 50 years Louis Pasteur explains the science behind sealing. When the food is heated in bottles or jar the microorganism in the food is vanished and the sealing protects food to enter any microorganism enter into food.

In 1810 instead of bottles and jar tin-coated irons are used and patented by Peter Durand. He also supplies a large quantity of canned food to Navy and army soldiers. In the 19th century, double stem technology is used to manufacture most of the modern can. Today the advanced water bath canning and pressure canning technology are used to preserve the food long-lasting.



Benefits of Canning

canning food at home is a safe and satisfying procedure that is regaining popularity as food costs rise and people recognize the importance of safeguarding their food supplies. Home canning is a great way to improve your intake of local foods by preserving food. Eating locally necessitates eating foods in season, and canning allows you to capture the bounty of any particular crop in season and increase its availability year-round.

You can do home canning as a hobbyist or as a full-time enthusiast who preserves a significant portion of his or her food supply. You will reap many personal benefits, while being a better steward of the environment and supporting your local economy, whether you want to enjoy a couple of fun weekend chores putting up jam or significantly supplement your diet. In addition, given the state of the global food market, you'll save money as well, especially as time passes. Unlike grocery store food, which comes in disposable packaging, your home-preserved meals will be stored in jars that you may reuse time after time.

Excellent taste and quality

When you utilize high-quality food and follow the canning process correctly, you'll be able to make items that are superior to those found in the supermarket. Many recipes for home-canned food are delectable, and the quality is unrivaled.

You'll have complete control over the ingredients because you'll be able to see where your food comes from when you can it at home. Your own garden and fruit trees, as well as local organic farms and any local farm, are excellent sources of fruits and vegetables. You can hand-pick your food at the peak of ripeness from any of these sources. You will also decrease your exposure to

Bisphenol A, which is used to line the cans of many mass-produced foods. Bisphenol A is an endocrine disruptor, and its potential danger to humans is becoming more widely recognized.

Local economic support

When you buy directly from local growers, you are putting money into the hands of locals. Local growers prefer selling from their own farms or market stands since they are not bound by the pricing established by large commodities buyers. This also permits local growers, particularly small ones, to maintain profitability, which is beneficial to the local economy.

Reduce your carbon impact

The food we eat requires a significant amount of energy to produce and transport. Pesticides, herbicides, and petrochemical fertilizers are also used in highly industrialized agriculture. All of these variables affect the ecosystem and limit the soil's future ability to produce food, resulting in increased scarcity, lower quality, and higher asset prices. When you buy local food products and can it at home, you are avoiding a large portion of the transportation costs connected with moving food across continents due to spent fuel. Yes, home canning consumes energy, but this pales in comparison to transporting food halfway across the country to supply a shop shelf. Lowering the amount of food, you consume which comes from distant locations reduces the amount of gasoline consumed. Also, while purchasing local produce, look for growers who employ environmentally friendly, sustainable producing practices.

Feeling of accomplishment

Once you start canning food, you will feel very satisfied. You'll feel as if you've accomplished something significant in your life, because you have!

For most of human history, individuals have spent a large amount of time and effort ensuring their food supplies. I'm not saying that we all go back to digging for roots in the field, but most people have a strong desire to help with food harvesting and preparation. Sitting in an SUV for fast food from a drive-through window does not satisfy. It just encourages excessive energy usage for low-quality goods.

Tools for canning and preserving

There are several tools that are necessary to canning. Many of them are unique to this form of cooking so you may need to invest in a few new kitchen supplies. However, almost everything in canning is reusable. From the pot you cook the jars in to the jars themselves, so much can be used time and time again, making your investment well worth the money. Choose quality products to ensure that they last you a lifetime of canning.

Jars

There are many sizes and brands of glass canning jars out there. From those with a smaller opening to wide mouth jars, quarts to pints, you can find them all! You always want to start your canning project with clean jars; however, glass jars can be reused again and again so save them after you use the contents. Make sure each jar is free of cracks or chips as this can interfere with the canning process.

Lids and Rings

Canning lids are one of the few things that you cannot reuse; they should only be used one time and then discarded. The metal lid has a rubber ring on it that is responsible for making an airtight seal, keeping the food safely preserved. Using the lid more than once can damage the rubber and make the seal more penetrable, making the food more susceptible to bacteria.

Metal rings, however, can be used time and time again until they become rusty. If you see any rust on your jar rings, dispose of them and use new rings. Be sure the rings and lids you choose fit the jars you have on hand. Different brands of lids and jars may not work together so it is best to stick with one brand for all your canning needs.

Headspace Measuring Tool and Air Bubble Remover

This is one of those tools that is not essential to canning but works fantastically. The tool has a small ruler on one end and a tip on the other end to help remove air bubbles. Headspace is the amount of room left from the top of the food to the top of the jar. It is essential to have the right amount of headspace to allow for the food to expand during cooking but not so much space that there is too much air in the jar, potentially giving bacteria space to grow.

Removing air bubbles from the food is also essential for preventing bacterial growth. The less air, the less chance bacteria have to grow. This tool helps you manage the air in each jar easily. However, you can always opt to use a simple ruler and a butter knife to remove air.

Jar Funnel

Using a funnel to pour the food into the jars is the cleanest way to fill your jars. It also prevents waste as you will spill less food. Many canning funnels can also act as a headspace measurer.

Magnetic Lid Grabber

Lids and metal rings are often sterilized before being placed on top of the jars by being simmered in water. The magnet on the lid grabber will pick the lids up right out of the hot water and help you place them onto the jars without ever having to touch the hot metal.

Jar Grabber

A jar grabber will help you take the jars out of the canner easily. The jars will be extremely hot after the canning process is complete and they will also be wet (meaning a simple dish towel won't help hold them!). Jar grabbers will lift the jar out of the canner, holding onto the lip under the metal ring.

Ladle

You will need a ladle or large spoon to scoop the food into the jars. A slotted spoon can be good to use as well as it can help balance the ratio of solids to liquids in each jar.

Dishtowel

When you take the jars out of the canner, you want to put them onto a dish towel rather than directly on your countertop. The extremely hot jars can damage your countertop if you are not careful, causing granite to crack or stoneware to split. You can also opt to place the hot jars on a cutting board, raising them up off the countertop as well.

Clean Paper Towels or Washcloths

After the food is scooped into the jars, the rims of the jars need to be completely wiped clean. This will help seal the jars and ensure there are no exposed food particles. Clean paper towels or terry washcloths work perfectly for this.

Distilled White Vinegar

Vinegar naturally kills bacteria—canning's number one enemy! Wiping the rim of your jars with vinegar before placing the lids on will prevent bacteria growth. Adding a splash of vinegar to your canning water will also prevent mineral deposits on your jars and keep your canner clean.

Timer

Canning is all about proper timing as jars need to be processed for a certain amount of time to ensure the safety of the food. You will need an accurate timer to help guide you.

Permanent Marker

After your canning is complete and your jars are ready to be put in your

pantry, you will want to label and date each jar. You want to remember what is in each jar and how long it will be good for. You can also use jar labels, but a regular old marker will work just fine.

Safety Criteria For Each Preservation System

There are a few safety tips that you should follow when you start canning and preserving foods from home. Canning is a great way to store and preserve foods, but it can be risky if not done correctly. Nonetheless, if you follow these tips, you will be able to can foods in a safe manner.

Choose the Right Canner

The first step to safe home canning is choosing the right canner. First off, know when to use a pressure canner or a water bath canner.

Use a pressure canner that is designed for canning and preserving foods. There are several types of canner out there and some are just for cooking food, not for preserving food and processing jars. Be sure that you have the right type of equipment. Make sure your pressure canner is the right size. If your canner is too small, the jars may be undercooked. Always opt for a larger canner as the pressure on the bigger pots tends to be more accurate, and you will be able to take advantage of the larger size and can more foods at once!

Before you begin canning, check that your pressure canner is in good condition. If your canner has a rubber gasket, it should be flexible and soft. If the rubber is dry or cracked, it should be replaced before you start canning. Be sure your canner is clean and the small vents in the lid are free of debris. Adjust your canner for high altitude processing if needed.

Once you are sure your canner is ready to go and meets all these guidelines, it is time to start canning!

Opt for a Screw Top Lid System

There are many kinds of canning jars that you can choose to purchase.

However, the only type of jar that is approved by the USDA is a mason jar with a screw-top lid. These are designated “preserving jars” and are considered the safest and most effective option for home preserving uses.

Some jars are not thought to be safe for home preservation despite being marketed as canning jars. Bail Jars, for example, have a two-part wire clasp lid with a rubber ring in between the lid and jar. While these were popular in the past, it is now thought that the thick rubber and tightly closed lid does not provide a sufficient seal, leading to a higher potential for botulism.

Lightening Jars should not be used for canning as they are simply glass jars with glass lids, with no rubber at all. That will not create a good seal!

Reusing jars from store-bought products is another poor idea. They may look like they’re in good condition, but they are typically designed to be processed in a commercial facility. Most store-bought products do not have the two-part band and lid system which is best for home canning. Also, the rubber seal on a store-bought product is likely not reusable once you open the original jar. You can reuse store-bought jars at home for storage but not for canning and preserving.

Check Your Jars, Lids, and Bands

As you wash your jars with soapy water, check for any imperfections. Even new jars may have a small chip or crack and need to be discarded. You can reuse jars again and again as long as they are in good condition.

The metal jar rings are also reusable; however, you should only reuse them if they are rust free and undented. If your bands begin to show signs of wear, consider investing in some new ones.

Jar lids need to be new as the sealing compound on the lid can disintegrate over time. When you store your jars in damp places (like in a basement or

canning cellar) the lids are even more likely to disintegrate. Always use new lids to ensure that your canning is successful.

Check for Recent Canning Updates

Canning equipment has changed over the years, becoming more high tech and therefore more efficient at processing foods. In addition to the equipment becoming more advanced, there have also been many scientific improvements, making canning safer when the proper steps are taken. For example, many people used to sterilize their jars before pressure canning. While this is still okay to do, it is not necessary as science has shown that any bacteria in the jars will die when heated to such a high temperature in a pressure canner. Sterilization is an extra step that you just don't need!

Make sure that your food preservation information is all up to date and uses current canning guidelines. Avoid outdated cookbooks and reassess "trusted family methods" to make sure they fit into the most recent criteria for safe canning. When in doubt, check with the US Department of Agriculture's Complete Guide to Home Canning which contains the most recent, up-to-date canning tips.

Pick the Best Ingredients

When choosing food to can, always get the best food possible. You want to use high quality, perfectly ripe produce for canning. You will never end up with a jar of food better than the product itself, so picking good ingredients is important to the taste of your final product. Also, products that past its prime can affect the ability to can it. If strawberries are overripe, your jam may come out too runny. If your tomatoes are past their prime, they may not have a high enough pH level to be processed in a water bath. Pick your ingredients well and you will make successful preserved foods.

Clean Everything

While you may know that your jars and lids need to be washed and sanitized, don't forget about the rest of your tools. Cleaning out your canner before using it is essential, even if you put it away clean. Make sure to wipe your countertop well, making sure there are no crumbs or residue. Wash your produce with clean, cold water and don't forget to wash your hands! The cleaner everything is, the less likely you are to spread bacteria onto your jarred foods

Follow Your Recipe

Use recipes from trusted sources and be sure to follow them to the letter. Changing the amount of one or two ingredients may alter the balance of acidity and could result in unsafe canning (especially when using a water bath canner). Use the ingredients as directed and make very few changes—none if possible.

Adhere to the processing times specified by your recipe. Sometimes the times may seem a little long, but the long processing time is what makes these products safe to store on the shelf. The processing time is the correct amount of time needed to destroy spoilage organisms, mold spores, yeast and pathogens in the jar. So, as you may have guessed, it is extremely important to use the times that are written in your recipe as a hard rule.

Cool the Jars

Be sure that you give your jars 12 hours to cool before testing the seal. If you test the seal too early, it may break as the jar is still warm, making the rubber pliable. Be sure to cool the jars away from a window or fan as even a slight breeze may cause the hot jars to crack. Once cool, remove the metal band, clean it and save it for your next canning project.

Don't Risk It

If you suspect that the food you have canned is bad, don't try to eat it, just toss it! Each time you open a jar of canned food, inspect it and check for the following:

- Is the lid bulging, swollen, or leaking at all?
- If the jar cracked or damaged?
- Does the jar foam when opened?
- Is the food inside discolored or moldy?

Does the food smell bad?

If you observe any of these warning signs in a food that you have canned, throw it away. Do not taste it to check if it is good. It is not worth risking your health to try the food after seeing one of the above signs.

Luckily, it is fairly easy to spot a jar of food that has gone bad. Home-canned food can spoil for many reasons. A dent in the lid, a small crack in the jar, an improper seal, or not enough processing time are all common errors that may cause canned foods to go bad. Follow the exact canning directions and hopefully, you will never get a bad jar of food!

Chapter 2: FAQ'S On Canning & Preserving Foods

This book has tried to cover all areas that a beginner or newbie in canning and preserving food would want to know. Nevertheless, there may still be some questions that are hanging in your mind. Here are the most frequently asked questions and their answers regarding canning and preserving foods.

As an interested beginner who would like to take this skill into a higher level, is there a canning class or course that one can take?

Anybody can preserve or can foods without formal education. For those who would like to have advanced canning skills, canning classes are oftentimes offered in some grocery stores, kitchen stores, cooking schools, community centers, and sometimes, even in libraries. You could also search online for correspondence that offers this course. Be careful with blogs or articles that teach canning techniques. Some of these articles may contain ideas or suggestions that go contrary to the recommendations of USDA. If in doubt, refer to the USDA manual or contact an authorized person.

What is the shelf life of canned food?

Properly sealed canned and preserved foods placed in a cool, dry place, with no signs of spoilage inside and out, are considered safe to consume for at least a year. However, canned foods stored near a furnace, in indirect sunlight, a range or anywhere warm can decrease shelf life. It would be safe to consume within a few weeks until a couple of months only. Placing the jars or cans in damp areas may corrode cans and this can cause leakage, causing the food to be contaminated and unsafe to eat.

Can you process two layers of jars at one time?

Yes, this can be done. The jars at the upper layer would enjoy the same benefits as those in the bottom. The temperature is equally distributed making

it safe for all jars, whether in the upper and lower layer. Just make sure that you place a wire rack between the layers to allow the circulation of water and steam around the jars. Also, when using bath-water canning method, make sure that the water is up to one inch above the tops of the jars in the upper layer. If you are using a pressure canner, the water should be 2 to 3 inches from the bottom. As always, comply with the processing time and required temperature.

During processing, some liquid of the contents were lost. What should be done about it?

If the liquid loss is minimal, there is nothing to worry about. The food will not spoil and the seal will not be affected. It may cause slight discoloration of the food, however, but that's about it. However, if the liquid loss is at least half of the original amount, then the most that you can do is to refrigerate it and consume within 2 to 3 days.

What is kettle canning and is this safe to use?

In this method, the foods to be preserved are cooked in an ordinary household kettle. After that, the foods are placed into hot jars, covered, and sealed. You would notice that no processing is done in this method. In addition, the temperature when using the kettle canning method is not high enough to eliminate the harmful bacteria that may be in the food. Also, during the transfer of food from the kettle to the jars, microorganisms can enter the food and cause spoilage and worse, food poisoning, later on. Therefore, the safety of food is not guaranteed. The kettle canning method is not included in the recommendation of USDA with regards to canning.

Why do some jars break during canning?

There are many reasons breakage occurs during the process of canning. Here

are five reasons:

The glass of the jar is not tempered. A tempered or toughened glass underwent a process that increased its strength and ability to withstand heat compared to normal glass. Before buying commercial food jars, make sure that they are manufactured for home canning.

Another reason is using jars with hairline cracks. These cracks are so thin that they can be missed or overlooked. Such jars would not be able to stand the extreme heat during processing time.

Not placing a wire rack on the bottom of the pot or canner could also cause the jars to break.

Putting newly cooked food into cold jars. The difference in the temperature between the food and the jars could lead to breakage. That is why it is advised that the jars should be maintained on a hot temperature before filling them with hot food.

Jars with unheated or raw food placed directly into boiling water can also break because of the sudden change in temperature. It is better to use hot water first and let it achieve boiling point after several minutes.

An article said that a jam or jelly with molds could still be used. Simply remove or scoop out the parts with molds. The rest would still be okay for consumption. Is this true?

Molds can cause an increase in the pH of the food. For instance, if the canned food is high acid, then because of the raised pH, it could become low acid. This places the preserved food into the risk of having botulism and other bacterial growth. Therefore, all canned foods with molds should be disposed of properly. Follow the proper waste disposal for spoiled canned food.

Can canning be done for those people with special diets?

Some people, because of their medical conditions, would not be allowed to consume some of the canned foods because of some ingredients like sugar and salt. Sugar is discouraged among Diabetic people due to the effect of increased blood sugar with the intake of simple sugar.

On the other hand, salts are always restricted among people with cardiovascular disorders as this can cause increased high blood pressure as more body water is retained because of salts. Still, canning foods can be done for these people even in the absence of salt or sugar. However, the color, texture, flavor of these canned foods will differ from those with sugar or salt in them, as expected. Other people find these special diet canned foods to be less acceptable and less appealing.

To can vegetables, meats, seafood, or tomatoes without salt, proceed with the regular canning minus the salt. This method is allowed, as salts are not considered as preservatives, hence the safety of food is still guaranteed even in the absence of salt. Salt substitutes can be offered upon serving to make the preserved food taste better.

What is the future of canning and preserving foods?

The trend all over the world right now is towards healthy food and lifestyle. You can see everything “organic” from cosmetics, hair products, food, baby products, and even processed foods. People prefer “fresh” than canned or commercially prepared processed foods.

This is where home canning and preserving fresh fruits, meats, poultry, salsa, vegetables, sauces, and what-have-you enter the picture. This is a combination of being healthy and modern, rolled into one. It meets the requirements of being healthy and at the same time, lasting longer on the shelf or pantry. It is ready to eat, answering the need for convenience and saving precious time.

More and more people are going into canning and preserving food. The threat of not having enough good food to eat in the future due to excessive wasting and unnecessary throwing of food today has found its solution in canning.

Chapter 3: Why Go Through the Effort of Canning?

To get the benefits of canning, you don't need a vast garden or a large-scale business. Even if your garden produces a few jars of your favorite vegetables, canning will reduce waste and preserve your crop, primarily if your garden produces more summer vegetables than you can consume right away. It can help you save your money on groceries while also giving you a sense of pride and self-sufficiency in food storage. You also control the components, including additives and preservatives, because you can find your vegetables. It can be pretty beneficial for both mindful eating and unique dietary requirements. Regardless of why you choose to can, you must understand when and how to can summer vegetables properly.

How to Prevent Darkening Food

Preventing darkening food in the jars is one of the most accessible can problems to fix. Here's what you need to do. Check the recommended processing time for the recipe that you're using because you need to know it. Water or syrup should completely cover anything you're canning. Before closing the jars, be sure to remove any air bubbles and utilize the required headspace depending on the recipe.

Floating Fluid

Do you have any jars with floating fruits in them? Fruits and tomatoes that have been over-processed might lose their natural pectin. Fruit may also float if the fruit is lighter weight than the sugar syrups or if it has been inappropriately packed.

What to Do If Your Fruit Is Floating

It's a simple repair if you detect floating fruit. The essential thing is to follow the instructions for processing periods to prevent over-processing the delicate fruits. Also, make sure the fruit is firm and ripe. Before packaging the fruit, warm it up. Fruits, unlike vegetables, should not be packed uncooked. Use a light or medium syrup, and compress the fruit carefully to prevent crushing it.

Canning, like gardening, is a skill that takes time to master. Making errors is an integral part of learning a new skill, so don't give up if you commit one of the most frequent canning blunders. Learn how to correct and avoid these blunders so that your canned foods endure for years in your cupboard.



Conclusion

Canning is also a great way to save money. You can preserve foods in bulk when they are at their cheapest (typically at the peak of the season when in abundance). Then, you will have the food on hand for whenever you like. You can pay the discount price up front and enjoy the canned food later, when the prices may have risen. Also, purchasing in bulk typically will reduce the cost of any food.

All canning is essentially the same; food is placed inside a clean jar and then sealed with a lid. The jars are then placed inside a water bath cooker or pressure cooker and processed (cooked) until the food reaches a high enough temperature to kill any micro bacteria. The jars are then cooled, at which time the lid will seal completely, and the canning process will be complete! Of course, this process will be covered in much greater detail throughout the book, but the general concept is this easy.

By now, you are likely ready to dive right into canning and get your first satisfying batch of canned foods made and on your shelf. So, let's begin! It is time to learn all about canning foods right in your own kitchen.

Canning and preserving foods at home is an amazing hobby that is beneficial and fun. It can help you save money on food, capture foods when they are at their peak ripeness and help you fill your pantry with foods that you love. Canning is completely safe to do at home when you follow all the necessary guidelines and it is also just a fun, satisfying pastime. There is nothing quite as pleasing as a cupboard full of newly canned foods!

If you have been wanted to try canning foods, now is the time to do it. Think of what food you would like to preserve and then dive right in! Start with basic water bath canning and then work your way up to using a pressure

canner. Or, dive right in and start pressure canning like a seasoned canner! No matter what you choose to create first, you are bound to be successful when you follow the steps in this guide. One key to canning that you always should follow is to have fun!

BOOK 2: DEHYDRATING COOKBOOK FOR PREPPERS



Introduction

Dehydrated food retains many of the nutrients of fresh food far better than other methods of food preservation. Fresh food can lose up to 50 percent of its nutritional value sitting in the refrigerator. But dried food retains all the antioxidants and minerals of fresh food, and most of the vitamins.

Dehydrated food weighs less and takes up less space in the pantry, making it ideal for road trips, hiking, emergency preparedness, and weekday meal prep. Let's dive in!

Dried food is typically brittle and can be snapped in half when bent. If food is still moist and pliable after drying, it should be returned to the dryer.

The easiest way to preserve food is by dehydrating or drying it. This method has been used for several years to help food last without being refrigerated. It is one of the least expensive and fastest ways to store your harvest for later use. Drying will also lighten the weight of foods prepared for backpacking and camping.

Dehydrating spectacularly lessens your food's moisture contents, making it last longer and still maintain its delicious taste. This is because it lessens the moisture contents of your food to between five to twenty percent, and the bacterium causing food decay cannot survive within that range. When you remove moisture from the foods you love to eat, you have also automatically extended their shelf-life.

As moisture leaves food, it often shrivels up and takes on a leathery, tough texture. The skin will wrinkle as the food inside shrinks. Compare a raisin to a grape taken straight off the vine and you get the picture. Grapes lose a lot of volume as the moisture inside them evaporates and they become raisins.

The health benefits of dehydrating are undeniable; this method retains up to

90 percent of the vitamins, minerals, and antioxidants in food. Preserving food by freezing retains about the same nutrition as dehydrating, but frozen food has a shorter shelf life. Dehydrated food is nutritionally superior to canned food; the high temperatures of the canning process deplete vitamin C, vitamin A, and many of the B vitamins.

Dehydrating allows you to control the ingredients in your food. You can choose how much sugar to put in the fruit leather or how much salt to put in your beef jerky. I especially like that you can also control cross-contamination with such common allergens as wheat, peanuts, or soy.

Drying food allows me to be creative both when preserving and using the ingredients in meals and snacks. It also bolsters my confidence, knowing my family is prepared for emergencies with safely stored healthy food, even if the power goes out.

This book is divided into three parts. In the first section, you'll find the basics to help you get started, even if you've never used a dehydrator. You'll learn about the equipment you need, some important techniques to ensure that your food is safe and free of bad bacteria, and how to pretreat food to ensure that the nutrients, texture, flavor, and color are preserved both in drying and in storage.

Chapter 1: Understanding Dehydrating

Dehydration which is popularly known as ‘drying’ is a long-practiced method for preserving foods. It can also be referred as the process of removing water through evaporation from a solid or liquid food. The aim of this is to arrive at a solid material that has been sufficiently water-reduced. This process consists of reducing the level of food moisture into smaller levels in order to extend the lifespan of the food. It requires adding different forms of energy to the food.

Note that dehydration does not include mechanical pressing of liquid foods. In most cases, Hot-air is used to add heat to the food and to reduce its moisture.

It is very easy for pathogenic bacteria to survive comfortably in the unfavorable environment of dried foods. This means that once your dried food is rehydrated and eaten, it could cause you food poisoning. Of course, you would not want to suffer food poisoning, all in the name of preserving your foods for later use.

What should you do then to prevent this when drying your food? Make use of high-quality materials with low contaminants when drying your foods. High-quality materials with low contaminants are materials and tools specifically made for dehydrating foods. Also, ensure proper sanitation of all tools and surfaces and ensure that the storage condition of the dried food is one that prevents contact with dust, rodents, insects and other house insects.

When you decide to dehydrate your food to make it last longer, then you have numerous options available for you. You could dry your food by air, vacuum, inert gas, steaming, or by directly applying heat to the food. Usually, the most popular and acceptable means of drying is by air. This is okay for obvious reasons. Using this method allows your food to dry gradually, plus it is very

convenient. And, yes, air is very plentiful, and free! Allowing your food to dry gradually by using air prevents scorching and discoloration of your food, which is popular with other drying systems.

Dehydrating foods started as far back as times when early men spread their harvests or hunts out in the sun for sun drying. It is one of the oldest methods of preservation, as the prehistoric men were fond of drying some seeds before planting.

Fish, meats and food plants have been preserved over the years by drying them in the sun or naturally spreading them in the desert heat, across different desert areas.

In more recent times, American Indians stored their meats by laying them under the sun. The people of China also dried their eggs from the sunshine and the Japanese dried rice and fish under the sun's rays as well. During the Second World War, there was a great need to move food in bulk from place to place and this challenge ignited the developments of modern strategies on preserving foods, hence dehydration. In the year 1975 however, the French made a major breakthrough in the development of hot-air dehydration, which is the drying of foods through the method of blowing hot air over them.

Browning reactions are one of the most common chemical reactions that occur in dried foods. They occur when chemical compounds in the food being dried react with compounds in the air. Browning is usually considered undesirable because it can change the taste of the food as it changes its appearance. A little known fact about browning is it can sometimes damage the nutritional value of the food as the color changes.

Many fruits and vegetables undergo enzymatic browning when they're cut open and their flesh is exposed to the air. This sort of browning also occurs when produce is dropped, hit with something or otherwise damaged. It's a

stress response brought on by the rapid conversion of chemical compounds in the flesh into brown melanin. The enzymes that cause browning can be deactivated through careful use of heat, acids or chemicals like sulphites. Blanching foods and/or exposing them to citric acids before setting them out to dry can inhibit browning enough to where it isn't much of a problem.

The Wonder of Dehydrating

A centuries-old technology, dehydrating removes moisture from fresh food so bacteria cannot grow. Dehydrating preserves your food for a year or more, without refrigeration. With 90 percent of the moisture removed, the food intensifies in flavor, concentrates its nutritional value, and takes up less room in your pantry.

In areas where the relative humidity is 30 percent or less, fruit naturally dries on the tree or vine, right in the garden. Airflow and heat are both essential to the dehydrating process. When left to nature, grapes turn into raisins slowly, dependent on local weather conditions. But in many areas the humidity is too high for this natural process to be successful. A food dehydrator controls the variables of temperature and humidity, speeding up the drying process and ensuring an end product that is safely preserved.

The first food-drying machine was invented in France in 1795 to aid Napoleon's war efforts. It used circulating airflow and temperature control to speed up the dehydration process. Dried food was useful for traveling armies because it was lightweight, retained its nutritional value, and took up less space than its fresh counterpart.

During the two world wars, dehydrated food was essential to provisioning the troops, leading to an increased demand and further innovation on an industrial scale. In fact, instant mashed potatoes were born from the war effort with the technology gained from dehydrating food for the troops.

Interest in home dehydrating was slower to take hold until the mid 1970s, when the back-to-the-land movement increased interest in home-scale food preservation. In response to this increased demand, several electric dehydrators for home use were patented that offered both airflow and heat.

When a recipe calls for blanching fruit or vegetables, it's usually done to stop or slow enzymatic action on the produce. Foods that need blanching should be processed quickly after cutting into them. The enzymatic action will initiate as soon as the flesh of the fruit or vegetable is exposed to oxygen. If you're planning on drying large amounts of produce, it's best to do so in smaller batches. Trying to do it all in one batch might result in the produce you cut in the beginning degrading to the point it can't be used by the time you get around to blanching it.

Color loss can also come about as a result of drying. This effect is especially pronounced when high heat or sunlight is used to dry leafy greens and brightly-colored vegetables that get their color from carotenoids, which are fat-soluble pigments. Pigments will often fade during drying and can further fade during storage.

Dried foods change texture when the moisture is removed. This is due to a number of factors, including the loss of moisture, changes to the cellulose material and degradation of some of the compounds found in the food. When foods are dried at too high a temperature, the outside of the food can dry before all the moisture leaves the inside, creating what's known as case-hardened foods. They appear dry on the outside, but there's still too much moisture inside the hard outer shell.

While it may sound like food drying is an invasive process that drastically changes food, it actually isn't that bad once you get past the physical changes. It's the least damaging food preservation technique and foods that are dried retain most of their nutritional value. Other preservation techniques involve the use of extreme heat or extreme cold, which is even more damaging to the structure and chemical composition of foods subjected to them.

From a technical standpoint, most food starts degrading as soon as it is

harvested. Once a plant or animal is no longer alive, it starts to lose nutritional value. This loss is slow at first, but quickly accelerates into rapid degeneration once the food begins to spoil. Anything done to prepare the food like heating it, washing it, slicing it or otherwise processing it further damages the food.

Dehydrators for home use offer continuous circulating airflow, temperature control, food-safe tray materials, and special aftermarket add-ons like silicone sheets to make it easier to make leathers and snacks. The latest digital models allow for temperature control between sections of the dehydrator, as well as programmable temperature and time variations for different foods. With electronic precision, you can put the food in, set the cycle, and go about your day.

What Should (and Shouldn't) Be Dehydrated

Fruits and vegetables are the easiest and most forgiving foods to process. Dried fruit can be eaten without rehydrating. It's a nutrient-dense food that makes an ideal snack. It can be added to oatmeal, muffins, and hot cereal to improve the nutritional quality of simple meals.

Dried vegetables are convenient for soups, stews, sauces, and dips where they can be rehydrated in the cooking process. Aromatic vegetables such as onions, garlic, carrots, celery, and peppers can be used as ingredients in meals on their own or combined into spice blends to add flavor to other dishes.

Lean meat, poultry, and fish can also be dehydrated, provided a few precautions are taken with these high-protein foods. When dehydrating, temperatures should reach 165°F (74°C) to kill any spoilage organisms. If your dehydrator doesn't go this high, place the food in the dehydrator at 145°F for at least 4 hours, until it is done. Then put it in a preheated oven at 275°F for 10 minutes so that it reaches an internal temperature of 165°F (74°C).

Cured ham can be successfully dehydrated, but pork should never be dehydrated at home or used for jerky. The temperatures used in a home dehydrator cannot destroy the trichinella parasite nor other harmful bacteria that are commonly found in pork.

Raw eggs and milk products do not dehydrate well. They are prone to bacterial contamination at dehydrating temperatures.

Fatty and oily foods cannot be dried adequately in a home dehydrator. The fat won't dry properly and as a result, the food spoils quickly. This includes high-fat foods such as avocados and olives.

When dehydrating meat, you should remove all visible fat. Only lean meat, poultry, or fish should be used for dehydrating. Ground meat should be no more than 10 percent fat. Fish like salmon and mackerel have too high a fat content to make them good candidates for dehydrating; they can be dried for short-term storage, but they should not be used for long-term storage due to the increased risk of spoilage.

Foods high in sugar or alcohol won't dry properly. Foods like alcohol-soaked fruit, honey, or candy tend to absorb moisture from the air and resist dehydration.

Benefits of Dehydrating

Everyone comes to dehydrating for different reasons. Some like the convenience and portability of dried food. Others use their dehydrator to preserve their garden veggies. Still others use their dehydrator to make food for hiking or camping trips. I use my dehydrator to preserve produce in season, when it is at the peak of freshness and nutrition. But regardless of your reason for dehydrating food, there are several benefits to dehydrating food that are universal.

Reduction of Spoilage

Dehydrating helps reduce unnecessary food waste. You can stop putting leftovers in the refrigerator and then tossing them in the garbage or compost pile a week or two later when they grow green fuzz. Both leftover vegetables and main dishes can be dehydrated, preserving your investment in healthy food, plus you'll have future meals for busy days. Dehydrating also allows you to stock up on produce discounts like overripe bananas or onions past their prime. Many grocery stores and produce stands have discount bins where "seconds," like citrus fruit, apples, sweet peppers, and tomatoes are offered at significant savings. Dehydrating these foods helps you stock your pantry while saving money.

A church in my community collects excess produce from local grocery stores, dehydrates it, and turns it into dried soup mixes and dried fruit for food banks in several nearby towns. Using a commercial dehydrator with 20 trays, they divert 9,000 pounds of produce from the local landfill each month and convert it into nourishing food for hundreds of families.

Extended Lifespan

When foods are dehydrated, they last longer because the moisture is reduced and the dry food does not encourage the survival of bacteria. The absence of

bacteria keeps food in good shape and this can last for as long as three months. When food items are dehydrated, they are sometimes converted into substances that can last a lifetime. Examples are spices such as cinnamon and curry powder which is derived from the dehydration and grinding of curry leaves. In most cases, spices like this can last for several years without getting spoiled.

Waste Reduction

When foods spoil, they reduce the amount of food available for consumption. Some food preservative methods usually give a very short extension before the spoilage of food. In many cases when we buy raw materials in the markets, the ability and knowledge to store them in good conditions help us keep the foods for a long time.

Improvement in Food Taste

The application of heat to reduce the water tastes in foods brings out the original taste of the other constituents of the food. The process of dehydration greatly improves the taste of food. When foods are water-filled, they are sometimes tasteless or acrid. When fruits are dried, the real taste is felt. In most cases, food tastes better when they are dehydrated.

Easy Storage

The fact that dehydrating foods make them easy to be stored is a great advantage of the process. When large bulks of foods are preserved in smaller packages, like the case of milk dehydrated into powder, it aids transportation and storekeeping. Through dehydration, storage is easier as it takes up lesser spaces.

Taste (and nutrition)

Dehydrated foods often taste better than when they're fresh, because their

flavors are intensified. Moisture literally “waters down” flavor, so dried fruits taste much sweeter, even without added sugar. Dehydrated mushrooms are so flavorful that many chefs use them as a spice, not a vegetable, while a small handful of sun-dried tomato flavors an entire pasta dish. The icing on the cake is that dehydrated food also maintains their nutritional value. Removing the moisture doesn’t destroy healthy vitamins, minerals, or calories.

Clean-eating

You can buy dried fruits, vegetables, and other snacks at the store, but more often than not, they’re full of sugar and artificial ingredients. Even though dried foods last longer than fresh ones, packaged versions usually contain preservatives to make them last even longer. This is especially true for dried meats, which are not only highly-processed, they’re usually extremely salty. Processed meat has also been classified as carcinogenic, which means it contains chemicals that might cause certain types of cancer! For all of this, you also pay a pretty penny. Making your own dehydrated snacks at home means you have total control over what goes in and what stays out.

Easy to carry around

There aren’t a lot of truly portable snacks and the ones that are, like fruits and vegetables, get easily squished and bruised. When they’re dry, they’re hardened and much more durable. They also don’t take up much space in a bag and they don’t squirt juice everywhere when you’re trying to eat them. Dehydrated food is the way to go if you’re always on the run.

Dehydrating food at home saves money and space, makes clean and tasty snacks, and reduces food waste.

Preservation of Nutrients

Dehydrating food maintains the nutrients in the food before they are

dehydrated. Nutrients such as minerals, vitamins and enzymes are absolutely preserved during dehydration. Dehydration is the only method that can ascertain the preservation of nutrients in food particles. Cooking and other preservative methods often lead to loss of nutrients. The entire essence of consuming food is to get benefits from the nutrients, if these nutrients are reduced; the essence of consuming the food has been lost.

Absence of Chemicals

The only substance needed to dehydrate food is the heat added to the food material. Unlike some other preservative methods, it does not involve the addition of chemicals. Dehydrating food therefore makes it safe from the fear of consuming poisonous substances because nothing but heat is added. The dehydrated food will only maintain its initial nutrients and that makes it perfect for consumption.

Economic and Financial Advantages

Dehydrating food makes food last longer. As such, people may buy food in bulk or harvest large quantity of produce and dehydrate it in batches, making it a very convenient method.

Reliability for Emergency Situations

Dehydrating keeps a person prepared for any emergency that requires immediate need for dehydrated food. Dehydrated food can be very useful for individuals traveling in extreme conditions, such as for mountain climbers and cross-country bike riders.

More Control over Food Contents

When you prepare your snacks and staple foods at home using your dehydrator, you control every step of the process—especially the ingredients. Healthy snack foods that are low in sugar and salt, or food without allergens,

can be made easily in your dehydrator. You can adapt recipes to ensure there is no cross-contamination of food, making dehydrating ideal for families who deal with food allergies.

One member of my family has a serious wheat allergy. Almost all commercially dried or freeze-dried food has an ingredient warning “may contain wheat.” But by drying our own produce and using our dehydrator for snacks and travel food, I have confidence that the food he eats is safe from cross-contamination, even when we are away from home.

Peanut, soy, milk, wheat, and other common allergens are easier to exclude when you provision your pantry with ingredients that you dehydrate yourself. When you make your own meals and snacks from scratch, you’ll no longer need a magnifying glass to read ingredient labels!

You can also control the amount of sugar, starch, artificial colors and flavoring, and other chemical additives when you dry your own food at home. If you have dietary restrictions or preferences, using your dehydrator to make meals or pantry items can help you reach your personal goals.

Raw foodies can control the temperature at which the food is dried, ensuring high availability of enzymes, vitamins, and minerals for their special dietary needs.

Time, Space & Savings

Investing in a dehydrator ultimately saves you money. Buying produce in bulk—and in season—offers considerable savings over grocery-store prices. Fruit, vegetables, and nuts can be purchased in bulk directly from local farms, and then dehydrated while at their peak of flavor and nutrition, at significant savings over buying fresh or even frozen vegetables.

Last fall, I picked up a 20-pound bag of Walla Walla onions for \$20 and a 25-

pound bag of sweet peppers for \$10 from the bargain bin at a farm stand. Walla Walla onions are \$3 per pound at my grocery store, and sweet peppers are \$4 to \$5 per pound. That's a savings of almost \$200! In just a few days, I dried all the onions in my dehydrator. I divided the peppers by color and dried the red ones first while waiting for the green ones to ripen.

The dried onions and peppers took up significantly less space in my pantry than the big bags of onions and peppers I brought home. Those two huge bags were reduced to four 1-quart jars and a pint jar that are much easier to store in my modest pantry.

Filling your dehydrator takes a little time, but it saves you time in the long run. Your dehydrated foods become convenience items once they are stored in jars in your pantry. It's so much faster to grab dried onions when you need them than to cut up a raw onion while making dinner. Think of the time it takes to prepare food for your dehydrator, and package it when it's done, as an investment in future convenience.

Emergency Preparedness

Dehydrated food is ideal for emergency food storage. Whether you are preparing for a weather event, a period of unemployment, or a natural disaster, having a 30-day supply of nutritious food on hand is wise.

Dehydrating food your family already eats ensures that you have as little disruption as possible in a real emergency. By stocking your pantry with dehydrated food that you've prepared from wholesome ingredients, you can be assured that your family's nutritional needs are met, even if you can't get to the grocery store.

Dehydrated food, when properly prepared and packaged for long-term storage, can form the foundation of a robust preparedness plan. Taking the

extra step to package your dehydrated food in Mylar bags or glass jars with oxygen absorbers ensures that your dehydrated food will still be fresh and retain its nutrients in storage.

But even minor disruptions can be helped by having the convenience of dehydrated food in your pantry. An extra dinner guest, sickness in the house, or an unexpected bill doesn't have to shake your confidence. Having dehydrated ingredients to make your favorite comfort foods already in your pantry can help you move through even minor inconveniences with grace.

High Nutritional Value

When food is dehydrated, the water is removed, but the nutrition in the food remains stable. The flavor and nutrients become more concentrated, and the caloric value remains the same. Dehydrated food has the same calories, protein, fiber, and carbohydrates as fresh food. It also retains the same minerals, fatty acids, and antioxidants as fresh food, as well as most of the vitamins. Dehydrated food retains many of these nutrients in storage, even over several months and years.

There is some loss of vitamin C and some B vitamins during blanching, because some of these water-soluble vitamins are lost in the blanching water. Vegetables that are blanched before dehydrating have the same vitamins as frozen food, but dehydrated food has a longer shelf life. This vitamin loss can be minimized by blanching with steam before dehydrating, rather than immersing vegetables in boiling water prior to dehydrating.

Hikers and athletes benefit from the concentration of nutrients provided by dehydrated foods, allowing them to eat less while maintaining their energy levels.

To ensure that your dehydrated food retains the most nutrition, it should be

dehydrated at its peak of ripeness, when the flavor, color, and texture are best. Vegetables that are past their prime and are fading in color, scent, or flavor will not make quality dried vegetables. Skip over the fading-green kale in the refrigerator vegetable bin. Choose the most vibrant-colored vegetables to get the most nutrition from your dehydrated food.

How to dehydrate

Preparing Fruits for Dehydration

Most dehydrating machines, no matter which brand or model you choose, are user-friendly. The first step in preparing fruits for the dehydration machine is selecting high-quality fruits.

Fruit should be fresh and at the peak of ripeness. Once you pick or purchase your produce, thoroughly wash it and discard any bruised or damaged pieces. Fruits may need to be peeled, cored or pitted, depending on the particular fruit you are handling.

After fruit has been peeled and sliced, it is advisable to apply a pre-treatment to maintain the color and freshness of the produce. Once certain fruits, such as apples, pears and peaches are sliced, their exposure to air initiates a chemical process called oxidation that results in discolored flesh. Using an antioxidant will temporarily halt the enzyme action and prevent further damage to the texture, flavor and appearance of the fruit. To make this solution, combine a small amount of ascorbic acid (1-2 tsp.) with one cup of water and coat the fruit evenly with the liquid.

Preparing Vegetables for Dehydration

When preparing your vegetables for dehydration, be sure to select high-quality, unblemished vegetables.

Particularly for certain vegetables such as root vegetables and potatoes, make sure they are thoroughly scrubbed and cleaned prior to dehydration. Similar to fruits, vegetables should be sliced thinly and uniformly for the best results.

Nearly all vegetables should be blanched first. Blanching vegetables halts enzyme action and thereby preserves the color and flavor of the food over

time. Because some nutrients may be lost during the blanching process, place the vegetables in boiling water only for the required length of time.

After the vegetables are submerged in ice cold water, carefully dry the foods prior to placing them on trays. Note that a small number of vegetables, like mushrooms and onions, do not need to be blanched prior to dehydration.

Preparing Meat for Dehydration

Dehydrated meats are delicious and simple to prepare, but do warrant special handling instructions. Only lean meats in excellent condition should be utilized for making jerky. When using ground meat for jerky, it should be at least 93% lean.

All other meat should have its fat thoroughly trimmed prior to slicing.

You might consider applying a marinade beforehand to flavor the meat. If so, keep marinated meats in the refrigerator or freezer before placing them in the dehydrator. After removing the meat from the refrigerator, blot its surface thoroughly to remove excess moisture and place on dehydrator trays. As always, raw meat should be kept away from other foods, and all surfaces and utensils that come into contact with raw meat should be thoroughly cleaned.

After using the dehydrator, experts recommend heating dried meat strips for ten minutes in a 275° F oven or for a longer time at a lower temperature. This additional step reduces any residual chance of contamination by eliminating pathogens, and also produces the most traditional style of jerky with respect to taste and texture.

Preparing Grains, Nuts, Beans and Seeds for Dehydration

Nuts, seeds, beans and grains can all be dehydrated using a similar two-step process. First, these foods must be soaked in a water solution. Soaking deactivates anti-nutrients, stimulates nutrients such as iron, potassium and

magnesium, and is beneficial to your digestive system. Soak nuts or seeds in a salt brine solution for 12-18 hours. Add ½ tsp. high-quality sea salt for every cup of water. Since wet nuts and seeds are not appealing to most people, you can place the nuts in the dehydrator to create a delicious, crunchy, ready to eat snack. After soaking for the recommended time, drain the water and proceed with instructions for your dehydrating machine.

Using Your Dehydrator Machine

Once the fruits, vegetables, herbs, meat, nuts or grains have been prepped, spread them in thin layers without overlapping on the drying trays. Turn on the dehydrating machine and set the temperature. Drying times vary depending on the dehydrator model you own and the food you are dehydrating. Most dehydrators contain guides that provide recommended temperatures and times for dehydrating specific foods.

In general, it is recommended that fruits and vegetables be dried at 130°-140° F. Meats and fish should be dehydrated at the highest temperature setting on your machine, which is typically between 145°-155° F. When dehydrating meats, it is necessary to use dehydrator models with adjustable temperature controls to ensure a product that is safe for consumption. Dried herbs require a temperature not exceeding 90° F, as aromatic oils in herbs are sensitive to high heat. Nuts, seeds and grains, which also have a high oil content, dry optimally at 90°-100° F.

Determining Food Readiness

Foods should always be tested for adequate dehydration before removal. Many factors determine the length of time necessary to dehydrate foods, such as the temperature, humidity, type of food, amount of food on the tray, size of the food pieces, and total quantity of food in the machine.

In general, meats should be dehydrated to 20% moisture content, fruits to 10% and vegetables to about 5%. You can analyze the appearance and texture of foods for signs of readiness. It is important to test only a few pieces at a time and allow them to cool before determining whether they are ready.

Checking food for readiness is largely a matter of assessing its structure. Fruits should be pliable, but not totally brittle. Test fruits by cutting them in half; if you cannot squeeze out any moisture, then the fruit are fully dehydrated. Vegetables, however, should be brittle when they are done. Test vegetables by hitting them with a hammer to see if they shatter.

Most fully dehydrated vegetables should break into pieces. Certain vegetables, however, will retain a pliable and leathery texture upon complete dehydration. These include mushrooms, green peppers and squash. To test jerky, bend one piece and see how pliable it is. The meat should bend, but not snap completely like a dry stick. The jerky should present as dark brown to black in color once it is fully dehydrated. Herbs are considered dried when they crumble easily. The stems of the herb should bend and break with little effort.

Recognizing Doneness

Food is done when it is dry enough to prevent bacteria from growing and spoiling the food. Different foods have different moisture requirements for safe food storage. The amount of moisture left in dehydrated food affects its flexibility. The more moisture, the more flexible your dehydrated food will be. You'll find specific guidelines in each produce entry and in each recipe to test for doneness so you won't be guessing. But here are some general guidelines for vegetables, fruit, herbs, and meat to get you started.

- Allow a sample to cool completely before testing for doneness. Most dehydrated food is flexible when warm but will firm up when cooled. If you are in doubt, dehydrate the food for a few more hours. It's better to dry longer than to stop drying too soon.
- Vegetables are usually done when they are leathery and brittle. When pressed between the thumb and forefinger, they should snap cleanly in half, without bending.
- Fruit is done when it is leathery but still flexible, and no soft pockets remain in the fruit. If you find soft, squishy sections, give the fruit more time. When the fruit is done, there will be no soft spots.
- Herbs are done when the leaves crumble when crushed. Stems should be hard and brittle. If the stems bend, they need more time.
- Meat should be dry and leathery with little flexibility when done, but specific meats vary in the test for doneness.

Storage

Once your food is properly dehydrated, your job isn't finished. It's important to package the food and store it to protect it from spoilage. Moisture, oxygen, and light can degrade your stored food, shortening the shelf life and allowing bacteria to ruin the food.

When stored properly and protected from moisture, heat, and light, dehydrated food can last for up to 10 years. The actual shelf life varies depending on the food, with fruit lasting longer than vegetables because the natural sugar in fruit helps extend its shelf life. (Consult the recipes for specifics on storage needs and the shelf life of individual foods.)

If you see any signs of spoilage, such as off-odors or mold, discard the contents of the package. It is not safe to eat.

Rehydrating

Rehydrating restores the moisture to dried food, returning it to its original size, form, and appearance. Rehydrated food retains its aroma, flavor, and texture as well as its nutritional content. There are several methods for rehydrating dried food, but in their simplest form, they all add moisture back into the food using either cold or hot liquids.

As a general rule, 1 cup of liquid reconstitutes 1 cup of dehydrated food. If the food hasn't softened enough after an hour, add more liquid. The liquid can be plain water, broth, juice, or milk. Fruit can also be reconstituted in liqueur or brandy.

Most fruit and vegetables reconstitute in one to two hours. However, larger pieces of food may take longer to reconstitute than powders or finely diced pieces. Generally, food that took longer to dehydrate also takes longer to rehydrate. Use only enough liquid as the food will absorb. Using too much liquid makes the food soggy and unappetizing.

Soaking does not take the place of cooking. Food still needs to be cooked after it is reconstituted by soaking.

Save the soaking liquid to add to soups, stews, or cereals. It contains the water-soluble vitamins and minerals leached from the dehydrated food.

Methods

There are two main methods of rehydrating: cold soaking and hot soaking.

Cold soaking should be used for foods that are commonly eaten raw, like fruit. It is a slower process that allows the tissues of the food to relax and absorb the liquid. Food that is reconstituted in room-temperature or cooler water retains its shape and texture better than food rehydrated using hot

water.

The soaking liquid, like juice or yogurt, adds additional flavor as it rehydrates the food, but don't add additional salt or sugar to the soaking water, as they hinder the rehydration process. These can be added once the food is fully hydrated.

Use hot soaking when the food being rehydrated will be served cooked or added to a hot dish. Hot soaking breaks some of the plant cells as it rehydrates the food, causing the food to become softer. Hot soaking rehydrates food quicker than cold soaking.

Rehydrating the food while cooking it is fast and easy. Place dried vegetables in soups, stews, or sauces and rehydrate as the sauce cooks on the stovetop. Add dried fruit to sauces, puddings, and warm cereals during the cooking process and rehydrate it while the rest of the mixture cooks.

The Objectives of Food Dehydration

Imparting a peculiar feature, such as a different crispiness and flavor, to a food product: An example is the transformation of maize to cereal.

Shrinking the food material into smaller and more portable sizes to change their forms: Food materials, when the water has been reduced, become more portable and are easily packaged for transportation. Examples are the draining and grinding of curry leaves, thyme seeds etc. into spices.

Reducing the volume and the weight of the food: The volume of water poses a substantial addition to the volume and weight of the food, by reducing the water content, the weight and volume of the food particle is also reduced.

The conversion of food meals to a different form that is more convenient for storage, packaging and easy transportation: A great example is the conversion of milk or dairies to dry powder. When these products get to the places of consumption, they are reconverted to the previous forms through the addition of water.

The effect of water depression which leads to preservation and longevity of the nutrients.

Disadvantages of Dehydration

Time Consumption: Dehydrating food requires a lot of time in order to achieve perfect results. Some foods have a large amount of water content and to reduce the water will require a lot of time and meticulous observation. Taking so much time may be inconvenient for some individuals.

Unwanted Weight Gain: Dehydrated food might be rich in calories. Since it has shrunk in size, it may appear small; a little quantity consumed may seem insufficient while a large quantity consumed implies large nutrient consumption. The excess calories in the dehydrated food may lead to weight gain. People should be aware of it when consuming dried food.

Loss of Nutrients: Although when done correctly, dehydrating food can preserve nutrients, when done incorrectly it may lead to loss of nutrients in the food. Some nutrients can't stand high levels of heat. The degree of heat applied therefore determines the survival of the nutrients in food. If the dehydrated food is not stored properly too, nutrient can be lost due to excessive heat and poor storage condition.

Change in Taste and Look: With high heat, the appetizing appearances of common meals change. In most cases, people are easily turned off when foods don't wear the expected looks. When foods are dehydrated, the loss of water makes it shrink and the looks drastically change.

Technical Knowledge: Since not all foods are dehydrated in the same way or following the same pattern, dehydration requires technical knowledge in order to be carried out well. There is also the place of experience which gradually makes a person perfect in the art.

Why is Dehydration healthy?

Dehydration is healthy for consumption because of the following reasons:

Retains Nutrients: As mentioned earlier, when we dehydrate foods, the nutrients in the food is one of our primary concerns. Unlike other methods of preservation, dehydration saves the nutrients in the dehydrated food, when it is carried out effectively.

Bacteria Free: Dehydrated foods are germ-free. When we keep these foods for a long period of time, they still maintain their healthy state.

No Addition of External Chemicals: The heat used to dehydrate food is the only external requirement for the process. This heat contains no chemicals or acids that may be dangerous for the food. Unlike some preservative methods which engage the addition of preservative chemicals, dehydration is a healthy choice for storing food.

Safe Handling: Since dehydration has nothing to do with handling dangerous chemicals or intense equipment, it is safe for the user to easily dehydrate.

Dehydration can be done with the simplest household mechanical devices like oven, microwave or a dehydrator. The smoke or steam that escapes from dehydrating food is not unhealthy to the environment, unlike regular burning of waste products. This makes the process healthy.



Chapter 2: Dehydrating Methods

You can get started drying using items you probably already have in your kitchen.

The following items are essential to the drying process:

- Food.
- A source of heat.
- Trays or racks to dry the food on.

The trays should be slotted wood or mesh trays. Avoid using solid trays because they block air from circulating all the way around the food. In a pinch, you can cover a wood frame with cheesecloth and use it as a drying rack.

Containers to store the food in:

That's it. That's all you need to get started drying. There are other items you can use to make life easier on yourself, but the above items are the only absolute necessities.

You want to avoid trays made from the following materials because they can add harmful substances to your food during the drying process:

- Fiberglass.
- Vinyl.
- Aluminum.
- Copper.
- Plastic.
- Galvanized metal.
- The following items aren't required, but will make life easier on you:
- A commercial food dehydrator.
- A fan.
- A blancher.
- A sulfur box.
- A scale.
- A thermometer.

Now that we've established the items you need and the items you can buy to make life easier, let's take a look at the various methods used to dehydrate food.

Use a fan to circulate fresh air into the area where the food is drying.

Using Your Oven

If you have an oven (and who doesn't?), you have a tool you can use to dry foods.

It isn't the best choice when it comes to drying, but it'll work in a pinch. The upside to using this method is it's one of the fastest methods of drying food. The downside is you can easily burn or scorch the food you're drying because it's difficult to keep the heat as low as you need it.

You can only dry small amounts of food in a normal kitchen oven. If you're planning on drying large amounts of food, buy a dehydrator and save yourself a lot of work.

You need to keep your oven temperature somewhere between 140 and 160 degrees F. To check oven temps, place an oven thermometer on the top rack and leave it there so you can monitor it. The temperature needs to be checked every 15 minutes to make sure it isn't getting too hot.

Place the food in a single layer on the drying trays. You can usually fit a couple pounds of food on each tray. Since most ovens have two racks, you're only going to be able to dry around 4 pounds of food at a time.

Here's a little trick you can use to fit more food in the oven: Place a couple 1 1/2-inch tall wood blocks on the bottom tray and set the next drying tray on the blocks. Then add a couple more blocks to the second tray and place another tray on it. You can fit up to four racks in your oven using this method, which will effectively double the amount of food you're able to dry at once. Since you're not heating the oven up too hot, you don't have to worry about scorching or burning the wood.

You need to prop the door open so there's a gap of 2 to 6 inches during the drying process. If you have a fan, set it up so it's blowing air into the oven

through this gap. You need to keep the air inside moving so the oven doesn't fill full of humid air.

Set your oven at its lowest temperature

If you have a gas oven, you may be able to get away with just using the heat from the pilot light. Monitor the temperature to ensure it stays above 140 degrees F and below 160 degrees F.

The top rack is going to be a little cooler than the bottom rack. Additionally, the air isn't going to be the same temperature in the front of the oven as it is in the back, especially if you're using a fan to circulate air. For this reason, it's important to rotate the trays every 20 to 30 minutes. Rotate the top trays to the bottom and flip the trays around so the food that was in the front is now in the back. You're also going to want to periodically flip your food over or stir it on the tray because the side of the food that's facing down will dry at a slower rate than the side that's facing up.

The process used to dry foods in a toaster oven is same as with a conventional oven. Place the food on a tray and put it in your toaster oven. Set the oven on its lowest setting and prop open the door. If you have a fan, use it to circulate new air into the oven.

Since this sort of oven is smaller than a conventional oven, it's going to dehydrate the food you're drying faster than the larger oven. Make sure you watch it closely and soon you'll have a small batch of dried foods.

Here's a quick tip you won't see in too many other books about drying: Open the door of your oven every few hours to let out all the damp air trapped inside. Sure, it will cause the temperature to drop inside, but it will let all the moist air inside escape, replacing it with dry air. The hit you take in temperature is temporary and it's worth it to fill the oven with fresh air.

If you only dry occasionally, your oven will do the trick nicely.

Sun-Drying

A Sun-drying food is the oldest method used to dehydrate foods, predating ovens by thousands of years. This method is all-natural and doesn't require use of electricity or gas (to preserve the food or store it).

All you need is a nice, sunny day or two (or 5) in a row and you can use the power of the sun to dry your food.

In warmer climates, you can dry food using this method year-round. In cooler places or in areas where there's typically a lot of cloud cover, there may only be a handful of days a year this method can be used.

You need dry, clear weather with temperatures of at least 90 to 100 degrees F to sun-dry food.

If you live in an area where it's typically cloudy or there's a lot of moisture in the air, you're probably better off using one of the other methods of dehydrating. It's OK to move foods you've started sun-drying in and finishing the process in the oven or a dehydrator if it looks like inclement weather is on its way.

To sun-dry your foods, spread a layer out on a wood frame covered in cheesecloth. If you're worried about bugs or other animals getting to your food, you can place a layer of cheesecloth over the top of your food as well. Turn your foods regularly to assure even drying or the side left exposed to the sun will dry at a faster clip.

Alternatively, you can run a piece of string through your food items and hang them out to dry. Items like meat can be hung from hooks.

Spread food out in a single layer with at least a couple millimeters space between each piece so air can flow around it. Set the tray out in an area that

gets sun for most of the day and has good circulation. Now, all you have to do is leave it there until the food is dry.

Leave the food out during the heat of the day, and then move it inside during the evening and night hours.

This accomplishes two things. It prevents the food from rehydrating due to condensation and it keeps the critters away. Animals enjoy dehydrated foods as much as you do and have been known to raid backyards at night. You don't want all of your hard work to be wasted at the hands of a marauding deer or raccoon.

Flip the food partway through each day. The bottom side gets less air and sun and will lose less moisture. Flip the food you're cooking over regularly so both side get equal amounts of sun.

There's no set time you need to leave food out to dry. All times shown in books and on the Internet are approximations of what it takes under "normal" conditions.

What exactly constitutes normal conditions is anyone's guess. What's normal in one place would be out of the ordinary somewhere else. That's probably why there's such variation in the dry times in different literature. I've tried to provide ranges in this book, but even the ranges can be off. The only way to make sure you dry your food correctly is to keep a close eye on it. When it gets close to the bottom end of the range, check it periodically.

The drying time varies based on the heat applied to the food, the humidity and the circulation of air in the area you're doing the drying. The hotter it is the faster food is going to lose moisture. The more humidity there is the slower moisture is going to be absorbed.

If you live in an area with a lot of vehicle traffic or high pollution levels, you

shouldn't air-dry your food outside. Pollution particles can land on your food and contaminate it. Over time, the particulates you're eating can build up in your system and make you sick.

Dehydrating Equipment

Dehydration is mostly about prep work, so having the appropriate tools will make your job easier. Make sure you have the following tools on hand.

Baking sheet: If you don't already have one, a good-quality baking sheet that disperses heat properly and doesn't buckle under high heat is a great addition to your kitchen. Use it for roasting vegetables and fish.

Blender: Blenders are great for making purées for sauces, soups, and fruit leather. A food processor or immersion blender also works for this purpose.

Four-cup measuring pitcher: These pitchers are good for measuring liquids and for measuring the yield of dehydrated foods (if you don't have a kitchen scale).

Kitchen knife: Aside from the dehydrator itself, a kitchen knife is the most important tool for dehydrating. A good knife will make your prep work much easier. Perhaps you already have a favorite knife one that keeps a good edge, has a straight blade, and is comfortable to hold for extended periods. Good knives don't need to be expensive. In our kitchen we use the same knives many culinary schools offer; they are inexpensive but great tools for the job.

Kitchen scale: An inexpensive digital scale is very useful for measuring ingredients with precision and is also helpful for measuring and portioning the completed and dehydrated meals.

Parchment paper: Line baking sheets with parchment paper to prevent food from sticking to the pan. It also makes for easy cleanup.

How to dehydrate

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After fruit has been peeled and sliced, it is advisable to apply a pre-treatment to maintain the color and freshness of the produce. Once certain fruits, such as apples, pears and peaches are sliced, their exposure to air initiates a chemical process called oxidation that results in discolored flesh. Using an antioxidant will temporarily halt the enzyme action and prevent further damage to the texture, flavor and appearance of the fruit. To make this solution, combine a small amount of ascorbic acid (1-2 tsp.) with one cup of water and coat the fruit evenly with the liquid.

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When preparing your vegetables for dehydration, be sure to select high-quality, unblemished vegetables.

Particularly for certain vegetables such as root vegetables and potatoes, make sure they are thoroughly scrubbed and cleaned prior to dehydration. Similar to fruits, vegetables should be sliced thinly and uniformly for the best results.

Nearly all vegetables should be blanched first. Blanching vegetables halts enzyme action and thereby preserves the color and flavor of the food over

time some nutrients may be lost during the blanching process, place the vegetables in boiling water only for the required length of time.

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All other meat should have its fat thoroughly trimmed prior to slicing.

You might consider applying a marinade beforehand to flavor the meat. If so, keep marinated meats in the refrigerator or freezer before placing them in the dehydrator. After removing the meat from the refrigerator, blot its surface thoroughly to remove excess moisture and place on dehydrator trays. As always, raw meat should be kept away from other foods, and all surfaces and utensils that come into contact with raw meat should be thoroughly cleaned.

After using the dehydrator, experts recommend heating dried meat strips for ten minutes in a 275° F oven or for a longer time at a lower temperature. This additional step reduces any residual chance of contamination by eliminating pathogens, and also produces the most traditional style of jerky with respect to taste and texture.

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Nuts, seeds, beans and grains can all be dehydrated using a similar two-step process. First, these foods must be soaked in a water solution. Soaking deactivates anti-nutrients, stimulates nutrients such as iron, potassium and

magnesium, and is beneficial to your digestive system. Soak nuts or seeds in a salt brine solution for 12-18 hours. Add ½ tsp. high-quality sea salt for every cup of water. Since wet nuts and seeds are not appealing to most people, you can place the nuts in the dehydrator to create a delicious, crunchy, ready to eat snack. After soaking for the recommended time, drain the water and proceed with instructions for your dehydrating machine.

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Vegetables

Dehydrating fresh produce entails a little more work. These need to be rinsed, peeled, and sliced into thin layers. Some may need blanching, boiling, coring and/or de-seeding.

Always dehydrate fresh produce in a conventional oven, with temperature set between 49° / 120° and 54° / 130° only. This allows gradual loss of moisture and prevents smaller pieces from burning.

When using the dehydrator, set the machine at lowest heat for delicate vegetables (e.g. leafy vegetables, onions, etc.); and at highest heat for hardier produce (e.g. legumes, root crops, etc.) or those that have thicker cuts.

Use approximately 1½ to 2 pounds per rotation.

Artichoke hearts, green peas, freshly shelled, etc.

Blanch with hot water and then dunk into an ice bath immediately to preserve color.

Drain well. Pat-dry using paper towels, if needed.

Follow recommended steps for oven drying or dehydrating. See: Oven drying: on page 28 and Dehydrating: on page 29. These may take between five to fourteen hours. These are done when these become brittle and wrinkled.

Beets, carrots, cassava, daikon (Asian radish,) potatoes, purple carrots, purple yam, sweet potatoes, yam, zucchini.

Scrub skins well.

Except for the zucchini, parboil (partially boil) veggies until slightly fork-tender (or when you can pierce outer layer with a fork.)

Remove from water and dunk into an ice bath immediately.

When veggies are cool enough to touch, peel, and slice into 1/8-inch thick disks. Drain well. Pat-dry using paper towels, if needed.

Follow recommended steps for oven drying or dehydrating. See: Oven drying: on page 28 and Dehydrating: on page 29. Beets may need three to ten hours of drying. These are done when individual disks feel dry and leathery to the touch. (Important: wear food-safe gloves to prevent beet juice from staining your hands.)

Carrots, potatoes, purple yam, sweet potatoes, and yam may need six to twelve hours. While the zucchini may need five to ten hours of drying. These are done when chips become crispy. Some pieces may have air pockets or browned edges, but these are normal.

Drying Herbs and Spices

Most herbs and spices are easy to grow at home, and many can be grown in small containers on your balcony, porch or any area of your house or yard that gets regular sunlight. In addition to being a considerable way to flavor foods, herbs and spices have a number of health benefits associated with them.

Drying is the convenient way to preserve herbs and spices because all you usually have to do is lay out the leaves, flowers or seeds and let them dry and then grind or crush them as you see fit. Herbs and spices should be dried in a dehydrator because drying them in the sun can bring them to lose some of their potency.

The following herbs and spices are good candidates for drying:

- Bay.
- Celery leaves.
- Chervil.
- Chicory.
- Chives.
- Cilantro.
- Cinnamon sticks.
- Cloves.
- Dill.
- Laurel.
- Marjoram.

- Mint.
- Oregano.
- Parsley.
- Peppercorns.
- Rosemary.
- Sage.
- Summer savory.
- Tarragon.
- Thyme.

Harvest herbs and spices by removing them from the plant in the early morning. Harvest them before the flowers open and be careful not to damage them during the harvest. Do not attempt to dry damaged pieces. The drying process isn't going to make damaged herbs and spices any better.

Lay the herbs or spices out in a single layer on the dehydrator tray and spread them out so there's a bit of space between them for air circulation. Most herbs and spices should be dried at temperatures between 115 and 125 degrees F, but be assured to check the documentation that came with your dehydrator to see what the recommended temperature for drying herbs and spices is.

The drying time for herbs and spices should be short. Most herbs and spices should be done drying in less than 4 hours. Herbs and spices are done when they feel crispy and are brittle to the touch. You should be able to crumble leaves, stems and flowers between your fingers.

Some herbs and spices can be hung out to air dry. Rosemary, thyme, sage and parsley can all be hung inside the house and left to dry. Basil, oregano and mint leaves need to be placed inside a paper bag before being hung out to

dry. Air-drying can be done indoors or out, but be sure to hang the herbs and spices in a shaded area if drying them outside. Air-drying herbs by hanging them can take a week or two to properly dry the herbs.

Herbs and some spices can be dried in the microwave if you're in a hurry. Microwave them on high for 2 minutes and check them. If they're still wet, microwave them for 30 seconds and check them again. Continue microwaving the herbs in 30-second increments until they're done drying.

Storing Herbs and Spices

Here's the dilemma. Herbs and spices will last a lot longer when they're left whole, but they're usually ground or crushed when they're used in recipes. It's kind of a hassle to grind or crush your herbs every time you want to use them, especially when you're looking to make a quick meal.

What I do is dry a large batch of herbs and spices. I crush up half of it and store it that way, so I always have crushed or ground herbs and spices on hand. I then store the rest of it in the freezer whole. When I start to run low, I crush or grind the herbs I have in the freezer and I'm ready to go. I know when I pull a batch out of the freezer, I'm going to need to dry more soon or I'm going to run out.

Are nutrients lost during drying?

There are some nutrients lost during pretreatment and drying. Any time the food is exposed to heat, light or oxygen, there will be some degradation of nutritional value. The longer the exposure, the greater the damage. Most fruits start degrading as soon as they're harvested. This degradation is sped up by cutting into them or otherwise exposing the flesh to oxygen.

Many fruits contain enzymes that react to the air and cause browning and nutrient loss to begin as soon as they're cut into. If you've ever left an apple or a banana out for a while and seen it turn brown, you've seen these enzymes in action. This reaction to the oxygen in the air can be slowed to a crawl by pretreating or blanching the fruit after it's been cut.

The following vitamins can be damaged by too much heat, light or air exposure:

- Folate (heat).
- Riboflavin (heat).
- Thiamine (heat, light).
- Vitamin A (air, light).
- Vitamin B12 (heat, light).

Commercial foods that undergo intense treatment lose a lot more nutrients than fruit dried at home. While commercially dried foods can lose up to 80% of certain vitamins, foods dried at home usually don't come anywhere near that magnitude.

Take the following precautions to reduce the amount of vitamins lost while treating and drying produce:

Work on small batches of food at a time.

When you work on large batches and try to get a lot of fruit done at once, the

pieces you cut into first are left to sit out while you process the rest of the produce. This can result in the earlier pieces degrading a lot faster than those cut later on.

Move food into pretreatment shortly after it's been cut.

Time is of essence when treating fruit that's prone to discoloration. It's important to slow down enzymatic reactions as early as possible to avoid nutrient loss.

Carefully regulate heat.

High heat can accelerate nutrient loss, so its important heat is monitored closely. Using a dehydrator allows you the most control over the amount of heat drying food is exposed to. Blanching also exposes food to heat and can damage nutrients, but may be critical to ensuring food can be properly stored. Blanching isn't as critical of a process with fruit as it is with vegetables.

Store dried food in an airtight container.

This will minimize the amount of air the food comes in contact with. If air is allowed into the container, the food can take up moisture from the air, drastically shortening how long the food will last.

Drying food in the sun exposes it to UV rays that can damage light-sensitive vitamins.

When vitamin retention is of concern, a dehydrator may be the better choice for drying.

Store food in small, single-serving containers.

Every time you open a container, more air is let in. Using single serving containers only exposes the food you plan on eating to new air.

No minerals are lost during the drying process, but pretreatment can cause

some mineral loss. Boiling or otherwise exposing fruit to water may cause some of the minerals to leach out into the water. This can happen during blanching and again during rehydration. The drying process itself doesn't affect minerals.

Calories and sugar are largely unaffected by the drying process, but they will be concentrated into a smaller package. A raisin has the same caloric content and amount of sugar as it did when it was a grape, but it's now packed into the smaller raisin. Dried produce has more calories and more sugar than regular produce when compared by volume. For example, 100 grams of grapes have 15 grams of sugar and 70 calories. 100 grams of raisins have 60 grams of sugar and 300 calories. Raisins have 3 times the sugar and more than 4 times the calories than grapes when compared by volume.

For this reason, it's important not to overeat when it comes to dried fruit and vegetables. They can be a healthy part of most diets, but only if consumed in moderation.

The Best Techniques to Preserve Dried Foods

Over drying the dried food is just impossibility. So, when you are unsure if the food is completely dry or not, keeps drying it until you are entirely sure.

Never use granulated sugar in fruit leathers as the sugar will get crystallize over time. You can opt for honey or corn syrup if you need.

To be considered “dehydrated,” foods must be at least 95% moisture-free. If they aren’t and you try to store them, they’ll quickly rot. How can you tell? If the food is soft, spongy, and sticky, it’s back in the dehydrator they go. You can’t really “over dry” food, so the harder and crunchier, the better. If you don’t want certain foods to be that dry, you’ll have to plan on eating them pretty much right away before bacteria has a chance to get at that moisture.

Store food properly

The last step you need to remember in the dehydration process is safe storage. All food should be stored in clean and dry containers, with airtight lids that can keep out moisture and bugs. If you're a prepper and don't plan on snacking frequently on your dehydrated foods just yet, vacuum-sealing is a great option.

Safe storage also means knowing how long a food is going to last, because even the most dehydrated food doesn't last forever. The only exception is freeze-dried foods, which can last decades, but most people don't have a special freeze-drier machine. Bear in mind that store-bought dehydrated foods last longer than homemade ones, because of the added preservatives. As an example, jerky you buy at the store lasts about a year, while home-dehydrated will only last 1-2 months when properly stored.

Health food stores usually stock bulk items such as rice, flour, pasta, millet, etc. Ask if you can buy them in bulk. Many stores will usually give a discount for whole case or whole bag purchases.

You will still have to store them in a bucket or some other container. You can use whatever food containers you have. Just make sure they were not used for toxic or hazardous materials. You don't want toxic residues to contaminate your food.

If you want, you can store your bulk items in plastic food storage bags available in any grocery store. The one-gallon and two-gallon sizes work well for this purpose. Squeeze the air out of the bag before sealing it. You can also add oxygen absorber packets before

After sealing the plastic bag, you can add an extra layer of protection by wrapping it with aluminum foil. This will act as a light bather. Then put this

in another larger plastic bag, squeeze the air out and seal.

Mylar Bags (Metalized Liners)

To seal these bags, you can use foil tape. One brand is Refectix and should be available in hardware stores. If not, check with plumbing supply stores. A 30-foot roll costs around \$4. If there is still air in the bag after you seal it, prick a little hole in it and push the air out. Then seal up the hole. Or you can use a portable heat sealer which can cost over 100 dollars.

If you don't want to use food buckets, you can store these packages in cardboard boxes – just make sure you have no mice. Or you can use the 18 gallon and 22 gallon storage tote containers sold just about anywhere (Wal-Mart, Kmart, Pamida, Gibson, hardware stores). Rubbermaid makes them as well as other companies. They cost around \$5 to \$7 each.

If there is a food service (restaurant) supplies store near you, go and see what is available that you can use.

The dryer the food is, the longer it can be stored for, so you'll want as much moisture in the food to be removed as possible. Airtight plastic bags and/or containers are great options for holding the food and resisting spoilage. Most of the nutritional value in dehydrated foods will be preserved, although it won't be as nutritious as it would be otherwise.

Remember that when storing any food for the long term, the food needs to be stored in a cool and dry location at room temperature. Any location that's humid or excessively hot should be automatically rejected for storing food because the food will be more likely to mold, even if it's been preserved.

How to Store Jerky

The best way to store jerky is to treat it like a fresh food item.

Limit the jerky's exposure to air.

Retain the quality of your jerky by placing it in an airtight container. Vacuum packing, sealable bags and plastic wrap can be used to wrap your jerky and are effective at keeping air out. The option that would allow the jerky to be most easily accessible is to place it in a storage container or jar that has a lid.

Label the container with the date at the beginning of the storage life so you know the age of the jerky and how long it has been stored.

Separate your jerky by type. Place different types of jerky in different containers to keep the flavors separate, ensuring top quality.

Eradicate any source of moisture.

Use a paper towel to dry your jerky. If you notice moisture or oil on your jerky, noted by wetness or a sheen on the surface, gently pat the surfaces of the meat with a paper towel.

Keep moisture at bay while the jerky is in storage by placing the jerky between layers of paper towel in the container. The towels will absorb any moisture from the jerky or container. Replace the towels when you notice any presence of moisture.

Know the shelf life of your jerky.

Time will take a toll on the quality of your jerky. With proper storage techniques, jerky can safely be stored for varying lengths of time depending on where you choose to store it.

Leave your jerky in a cool, dry place. When placed properly in an airtight container, you can leave your jerky on the counter top or another cool, dry

place for no longer than 1 month.

Put your jerky in the refrigerator. Jerky can be stored in the refrigerator to be used within 6 months.

Store homemade jerky in the freezer. Jerky lasts up to 1-year when kept in your freezer

How to Store Herbs?

When completely dry, separate the leaves from the stems, and store the leaves (either whole or gently crumbled) in light-proof containers.

In terms of oven-drying, allow the dried herbs to cool, and gently crush the leaves. Store the dried herbs in light-proof containers.

Store all your dried herbs in a cool dark place, in airtight containers.

Never store your herb vinegars in the sun or on a lighted counter if you intend to use them, no matter how pretty they look. They should always be stored in the refrigerator.

FAQS

How long will dehydrated food last?

If prepared and stored properly, dehydrated food can last 5 to 10 years. But it is advisable to use your own within four to six months.

Does dehydrating food remove (or preserve) nutrients?

Yes, some nutrients may be removed when food is dehydrated but no more than other methods of preservation. Heat and light are responsible for the breakdown of vitamins. By implication, the canning method of preservation tears down more nutrients than the low heat, low moisture dehydrating method. The amount of thiamin and vitamin A & C that diminishes from your vegetables can be reduced through blanching.

Does dehydrating food kill bacteria?

Provided that you dehydrate your vegetables and fruits until their moisture levels are anywhere between five and twenty percent, you have removed the bacteria that can cause food to decay. If you are concerned about bacteria on meat, it is recommended by the USDA that you first heat your raw meat to 160°F temperature and then dehydrate at a steady temperature of 145°F.

Does Dehydrate Food Increase Sugar

In most cases, yes, because when you dehydrate food at a higher temperature, it will cause the death of enzymes. More dense foods may withstand higher temperatures without the enzymes being killed. But most enzymes will ultimately become dormant when the temperature rises between 140° to 160°F.

Can Cooked Food Be Dehydrated?

Yes. Meals can even be dehydrated, but some cooked food dehydrates better

than others. If you are drying food for long-term storage, camping, or backpacking, you can prepare rice dishes, stews, and desserts and dry them by using nonstick sheets on the trays of dehydrator. And then remove the nonstick sheet when they have reached a moist, crumbly consistency.

How can I store dried food?

Dehydrated vegetables can last up to ten years and fruit up to five if properly stored. The best way to preserve your dried food for the long term is to vacuum seal using an oxygen absorber and keep it in a cool, dark place. If you are going to eat non-meat dried food within 12 months, store them in reusable storage bags or freezer bags with the air squeezed out.

If you will consume seafood and meat within a month, you can store in freezer bags and keep them in a cool, dark place; otherwise, the best thing is to vacuum seal and freeze them. Meat can last for up to a year if properly stored in the freezer.

The Best Ways, Temperature and Cooking Times to Dry Foods

Ways at Home

Pre-treating food

For best results, most of the food items need to be pre-treated before dehydration. Following are the commonly used pre-treatments:

Ascorbic acid or Vitamin C bath

By soaking fruits or soft vegetables in an ascorbic acid solution (one-part of ascorbic acid in 1 gallon of water) immediately after cutting will stop discoloring and browning. An exception is leafy greens, herbs, and broccoli as the acid will discolor them severely. For this, soak the cut fruits immediately in the solution for 8 to 10 minutes. Drain for dehydration.

Skin cracking

Fruits with tougher skins such as plums, cherries, grapes, figs, or berries may need their skins to be cracked before dehydration to pull moisture out from the fruit properly. For this, boil a pot of water and dip the fruit in it for 15 seconds. Remove and dip them in ice-cold water immediately. Drain water entirely before drying them.

Blanching

It is a process used for scalding vegetables in boiling water or steam, to stop the enzymatic action within the vegetables. Be cautious about the timing, as over blanching results in loss of nutrients and under blanching can cause food spoilage during or after the dehydration. For blanching, usually, two methods are used: boiling vegetables in water for some time, and scalding vegetables above the boiling water level, also known as steam blanching — steam from the boiling water scalds the vegetables.

Citric Acid bath

Citric Acid kills bacteria and stops food discolouration. For this, mix a teaspoon of citric acid in 2.5 cups of water, or you can mix equal parts of water and lemon juice. Soak the food for 8 to 10 minutes and drain entirely before dehydration.

Storage

Dehydrated foods can last for years if stored properly. To ensure maximum shelf life, you need to prevent dried food from moisture, heat, microorganism, light and oxygen. Essential steps of storage are:

Cooling

When the fruit is dry enough, remove it from the dehydrator and cool the fruit completely in a cool and dry place for half an hour; storing warm food will reintroduce moisture due to condensation. Make sure not to leave the dried food for too long as it will also result in moisture to come back into the food.

Conditioning

To ensure even distribution of moisture within the food, place the dried food in loose packaging and seal it for 2 to 4 days.

Packaging

As a final step of storage, you need to pack your dehydrated food in air-tight jars or cans. Store your jars or containers in a cool, dark, and dry place to maximise the shelf-life.

Types of Dehydrators

Although there are many methods to dehydrate food such as sun drying and oven drying, the most convenient method is by using an electric dehydrator. Why?

Because it is an easy and hassle-free way to dehydrate your food.

You can get commercial electrical dehydrators from the market that matches your needs, or you can go for DIY dehydrator at home.

DIY home dehydrator

You can construct your dehydrator, if you need to produce large batches of dried foods, from a wooden framed box. All you need is constant heat (gas burner) and airflow (a fan) and few shelves or trays to put food on. However, it becomes difficult to control the temperature levels if you are a beginner, and sometimes it results in a complete mess due to a complicated cleaning process. You need a lot of experimentation and testing to achieve the optimum temperature levels in DIY dehydrators.

Electric dehydrators

If you plan to dry your food regularly, then investing in a commercial electrical dehydrator is the best option. They can handle large quantities of food, and the best part is, you can control the temperature and air circulation without putting much effort. In a useful and well-made electric dehydrator, the temperature remains constant throughout the drying process with the help of a thermostatically-controlled heating system, and proper airflow is achieved through a built-in fan to ensure complete evaporation.

You can get a small unit with 4 or 5 trays under a hundred dollars if you want to dry small batches in one go. However, if you intend to dry a lot of food at

once, you can get a commercial dehydrator with ten trays or more.

Dehydration Tool Kit

You have bought a good and suitable dehydrator, but there are still some other tools and products you may need to increase the productivity and the quality of your dried food. But remember to keep them simple and easy to use. You would need:

- Apple peeler and cherry pitter for quick and efficient work
- You will need a deep container with a tight lid for blanching
- A colander to fit into the container to hold food items for blanching
- Stainless steel knives for cutting food and meat
- Ascorbic acid or lemon juice to give Vitamin C bath to fruits
- Large pot or tub to hold Ascorbic Acid or lemon juice solution
- A blender to make fruit leathers, or to powder your dehydrated food
- Disposable latex or vinyl gloves to handle dried foods to prevent spoilage as handling dried foods with hands transform moisture and heat from your hands to the food.
- Nylon mesh to place on trays or shelves
- Air-tight containers for storing dehydrated foods such as mason jars or cans with air-tight lids, or zip lock bags that can be vacuum-sealed.
- A food processor for grating and slicing vegetables evenly
- A meat slicer to cut the meat evenly in desired thickness quickly and efficiently, and for slicing the fruits and vegetables evenly for making chips and crackers.
- .Sometimes you need to soak and spray the food with vitamin C or lemon juice before dehydrating to avoid browning. For this, a spray bottle is a mess-free option and do the work quickly.
- For making leathers, a squeeze bottle is quite useful. You can squeeze the puree out straight onto drying sheets, or you can even mix different

colored purees to form a multi-colored design.

Using a dehydrator is the most effective way to remove moisture from food and extend its shelf-life.

Dehydrator-drying

Dehydrating with a food dehydrator is the best method these days. You have control over temperature, time, and air flow. You place food on a tray, close the lid, and heat at the appropriate temperature with an electrical heating element for the given time. Times vary depending on what you're drying and how much. A fan circulates heat around the food, while vents allow the moist air to escape.

Quality

Any appliance that touches food should meet certain standards. Add heat, and the possibility of food becoming contaminated with chemicals, and the quality of materials becomes a big issue. Dehydrator trays are made of plastic, so you want to check if they're BPA-free if it's a concern for you. With better materials comes a higher price tag, but that isn't the primary driver of cost. You can still find affordable dehydrators made from relatively chemical-free parts.

Conclusion

Dehydrating has the potential to be a great solution for many people who are trying to find a cheaper and healthier way to eat, store, and preserve their foods. After the initial investment that comes in the form of buying Dehydrating supplies, canning your own food in the comfort of your kitchen can be a rewarding – and economic – experience. For beginners who are just trying to figure out whether they'd like to take Dehydrating up as for the long-term, you do not have to go all out and buy all the supplies. There are many alternatives to the standard Dehydrating supplies that you can purchase – they tend to be cheaper and just as effective as the original canning supplies.

You do need to know, though, that there are different methods for different foods. Some methods involve boiling water; other methods involve pressure cookers and other tools. With every method, there are different sets of supplies needed. If you are a beginner, you will struggle with finding the appropriate tools and selecting the right methods for canning and preserving your foods.

When food comes out of the dehydrator, it looks vastly different from its original state. Hummus and soups can look as cracked and parched as a desert floor. Food can come off the trays in thin sheets, which you can break into smaller pieces. Properly dried pieces of fruit bend but don't break, and they do not feel moist when you squeeze them. Other foods—vegetables, grains, and legumes—should be hard and dry.

It is possible to burn food in a dehydrator, so pay attention to both the temperature and timing recommendations given in the recipes. Also, when you're learning how to dehydrate food, be sure to check the food every few hours. You may need to rotate the trays to ensure that the food dries evenly,

and if you find that part of your recipe is dry before the rest, remove that part and store it while the rest of the recipe continues to dry. There is often one ingredient in each recipe that takes longer to dry than the rest, and that ingredient will be called out in the recipe as the barometer for when the food is dry. In the **Red Curry Vegetable Stir-Fry**, for example, that ingredient is the red bell pepper, which has a very high-water content.

Storing dried food is a crucial step to ensure the most extended shelf life. If not stored well, moisture, heat and oxygen decreases the shelf life and turn them bad sooner than expected. Store your dehydrated bounties in a cool and dry place, or in zip lock bags in the freezer to ensure longer shelf life. You can increase it by vacuum sealing the bags and then store them in the freezer.

The moral of the book is that before you get too enthusiastic about dehydrating batches upon batches of dried foods and piling your pantry up with all your favourite foods, you need to look and practice all the rules of dehydration and have an idea for the space you have for storing; it will be of no use if you are drying more than the available space unless you intend to sell or gift them.

Remember, different foods have different timings and pre-treatments, so you must follow each step accordingly. Thoroughly drying the food is the key to successful dehydration. The presence of liquid in the dehydrated food turn it fetid and prone to many harmful bacteria such as E. coli. Also, selecting the best quality food ensures a healthy and perfect dried food. Always prefer farmer's market for selecting fruits and vegetables as they provide the freshest food.

When you start to head off with your creative ideas for dehydration, try to limit it to one or two new ingredients. Occasionally what appears to be a great idea, can muddle the flavours or emphasise the taste of the original

fruit, vegetable or meat. Limiting the ingredients to one or two possible suspects will enable you to distinguish the culprit quickly.

BOOK 3: CANNING MEAT FOR PREPPERS

Introduction

Preserving food is a process that has been around for centuries. Modern technology has been a boon, making life very simple for us. While we can simply head out to the supermarket to pick out what we need, our ancestors had to preserve food to survive the winter. Historical evidence shows that people in the Middle East would preserve food by drying it in the sun. While that process took a lot of time, it saved people from starving in the winter. The practice of drying food, especially fruit, was also a common practice in ancient Rome. In regions where there wasn't enough sunlight available, the Romans built "still houses," making it feasible. In different regions, different were used approaches based on the means available to their inhabitants.

Food preservation at home is still a prominent topic of discussion. When a shortage of canning supplies such as jars, lids, and canners became an actuality in 2020, experts and household food preservers noticed a surge in demand in home food preservation. As more people store food at home, it's worth revisiting the history of food preservation.

Although chemical reactions like oxidation can harm some food, most food is spoiled in-store by living organisms such as bacteria, molds, and yeast. As a result, food preservation methods rely on destroying or preventing the development of these microorganisms.

Many of our most popular methods of food preservation have been around since the dawn of time and can be found in a variety of places. Drying, smoking, pickling, and fermenting have all found their way into the cuisines of different nations worldwide. Although the approaches differ, they all aim to produce a condition that is unfriendly to microorganisms like molds,

bacteria, and yeasts.

Canning is the process of preserving foods inside a glass jar. Most foods are stored in either pint—or quart-sized jars, although other sizes are available as well. Canning helps to prevent the growth of harmful microbes in your food, and also protects against countless foodborne illnesses. When done properly, canned foods can last anywhere from a year to a hundred years.

If done correctly, canning is a vital and safe technique of meat preservation that should be used often. The canning procedure is putting foods in jars and heating them to a temperature that kills bacteria that may provide a health risk or cause the food to deteriorate if left untreated. Canning also has the additional benefit of inactivating enzymes that may cause the food to deteriorate. Vacuum seals are created by forcing air from the jar during heating and then allowing it to cool. This keeps the product from being refilled with air, where it might introduce bacteria that could taint the meal once again.

Canning and preserving meat offers numerous benefits. While preserved meat can easily be purchased from the market, commercial products neither offer the same quality nor the satisfaction of preserving food on your own. In addition, they usually are more expensive and often contain artificial preservatives. Whether you grow your food or purchase food in bulk, food preservation can help you stock up, save money, and enjoy your favorite foods all year long.

Chapter 1: Understanding Meat Canning

Canning and preserving meat is an amazing hobby that is beneficial and fun. It can help you save money on food, capture foods when they are at their peak ripeness and help you fill your pantry with foods that you love. Canning is completely safe to do at home when you follow all the necessary guidelines and it is also just a fun, satisfying pastime. There is nothing quite as pleasing as a cupboard full of newly canned foods!

If you have been wanted to try canning foods, now is the time to do it. Think of what food you would like to preserve and then dive right in! Start with basic water bath canning and then work your way up to using a pressure canner. Or, dive right in and start pressure canning like a seasoned canner! No matter what you choose to create first, you are bound to be successful when you follow the steps in this guide. One key to canning that you always should follow is to have fun!

So, grab those canning jars, take out that big canner pot and start cooking some food to preserve! You will have your shelves filled with beautifully preserved foods in no time.

Canning your own meat is a deeply satisfying activity. When you take a look at your canned foods and you realize that you were able to do it on your own, it will fuel the motivation you need to turn this into a regular habit. If you choose to can your own food on a regular basis, you will notice a decline in the amount of money you use to buy produce and other canned foods. Home canning will also influence your eating habits in a positive way. The foods that will be preserved will be far healthier than the preserved foods that are sold in supermarkets.

It's funny how we always crave our favorite fruits and veggies during their off-season. Not being able to satisfy those cravings can be quite frustrating.

But it doesn't have to be like that. Canning and preserving your favorite food can give you a way out. Canned and preserved food can taste just as good as when you first preserved them. The best thing about this is that the process is quite straightforward, and a lot of things can be canned and preserved, such as jams and jelly, fresh fruit and vegetables, and meat and pickles. And all this can be done without adding any artificial preservatives.

As time goes by, though, the number of mistakes you make will decrease, and eventually, you won't need this guide to assist you. You will be able to come up with creative recipes of your own! This all has to start with the first steps; the first steps are that you are giving this a chance.

Whether you are new to preserving or an old hand, there is a recipe in this book that will inspire and amaze you. You will have no problem finding a simple method for dishes like spicy apple chutney to spread on your pork chops to delicious mango chutney to spread on a fresh piece of bread. Store these delicacies in the refrigerator in jars or sealable containers in the freezer or eat the batch in one sitting with your favorite people! One thing is for sure; chutney is a delicious preserve.

Don't let your fears stop you from trying out this great method of preserving your own food. It is a highly rewarding experience that is capable of benefitting you for years to come.

History and Development of Canning meat

The need to preserve food dates as far back as the first years of the Napoleonic Wars. The French government offered the hefty reward of 12,000 francs to the inventor that could produce an effective way of preserving large quantities of food for a prolonged period of time. The requirement resulted from the need to support Napoleon's military campaigns. The winner of the contest was Nicolas Appert in 1809.

He noticed that unless the seals leaked, the food cooked inside a jar did not spoil. Acting on this observation he developed a method to seal food in glass jars. The reason that the food did not spoil, was discovered 50 years later by none other than Louis Pasteur who noticed and recorded how microbes affected the food spoilage.

Glass jars presented a challenge, as there were a lot of problems involved in their transportation. The solution was given by Peter Durand in 1810 who devised the familiar cylindrical wrought-iron canisters (the root of the modern term cans). Durand's cans solved the fragility problem of the glass jars and they were also cheaper and faster to manufacture. However, glass jars still remain as a good option for canning high value products at home.

Durand's cans may have solved the glass jars' inadequacies, but they presented another problem. Not everyone could use a bayonet to open a can up. Sometimes it was necessary to smash the cans with rocks to open them up. This necessitated the development of a can opener which didn't happen until 1840, largely due to the fact that the factory and the know-how of Nicolas Appert were all but destroyed in 1814 by the coalition soldiers invading France.

The next step was the development of the famous tin can. It would seem that

the entire canning concept was something that the French could be identified with (in a similar fashion that the Fins were identified with driving and the Brazilians identified with soccer), as another Frenchman, Philippe de Girard was the one who thought of the method and developed it with the assistance of Bryan Donkin and John Hall. The product was dubbed as a tin can because the material used was tinned wrought iron.

Tin cans became a massive success. Initially amongst the military forces of the British Army and the Royal Navy and then commercially. It is indicative of this success that by the mid-19th century, canned food became a status symbol for the middle class.

This success was mitigated heavily after the Franklin expedition disaster in 1845, which vividly demonstrated that canned food may entail serious health hazards. In this case it was the lead solder that was used for sealing the cans and that was proved to be extremely poisonous to humans. The situation was remedied through various improvements and side inventions, and by 1860 the increase in urban populations demanded for increasing quantities of canned food. At that point, the time required to cook food in a sealed can was reduced from six hours to thirty minutes.

The next major advancement in the canning technology occurred during World War I. In the beginning the food contained was cheap and of low quality. The majority of the cans contained the then famous 'Bully Beef' which was actually very cheap corned beef. To improve the morale of their soldiers the British begun purchasing food of higher quality and then created the staple of all military forces even to this date: the complete meals.

As incredible as it may seem, the last major development that occurred around the 1900s remains the same until today. And this is the double seeming technique which completely sealed the cans and made them totally

airtight and allowed for the food inside to remain uncompromised for a period of at least five years, even at the worst of storing conditions.

The only change that has happened during the manufacturing stage of a can recently, is the substitution of steel and wrought iron with aluminum compounds, which made the can production faster and cheaper.

While it is possible to manufacture metal cans at home, it is preferable to either purchase readily made ones that have observed the safety precautions, or use glass jars if you want to prepare and can your own canned food and keep it stored to be used in case of an emergency.

Benefits of Canning and Preserving meat

Nutrition

Fresh produce, like fruits and vegetables, are known to start ‘dying’ and lose their vitamins from the moment they are harvested from the ground. Up to half, or even more of the vitamins may be lost within a few days if the fruits or vegetables are not stored in a cool place or preserved appropriately. It takes up to two weeks for refrigerated produce to lose its vitamins and start deteriorating. If fresh produce is harvested, cleaned, and stored in a good time, the majority of its vitamins will be preserved. Fruits and vegetables that are harvested and canned properly will be able to be of higher nutritional value than fresh produce that is stored in makeshift conditions.

The problem with a lot of products that is sold in commercial facilities these days is that a number of chemicals and substances have been used to improve the appearance of the produce, and its shelf life too. Fresh produce, when exposed for a long amount of time, will become home to microorganisms, regardless of the storage conditions. Some shops are neglectful with their products and this ends up affecting the health of consumers. When you choose to can your own food and even grow your own produce, you can avoid using potentially harmful substances. Canning is simply preserving fresh food in its original state. The preservatives that you will use are also natural; acids such as lemon juice or vinegar are known to have a great number of benefits for the human body.

Economical

As mentioned above, fresh produce is not able to last for long; it isn’t cheap, either. Canning can be very useful for a person, especially when it comes to preserving seasonal fruits and vegetables. The price of seasonal produce is

usually high and after a certain amount of time, it becomes hard to find these fruits and vegetables again. Canning allows you to preserve fruits, vegetables (and other foods) in bulk, allowing you to keep a steady supply of vegetables for a longer period of time, and for a lesser amount of money. If you are into planting and harvesting your own produce, this will slash your food expenses in half. You will be able to rule out buying produce regularly since you'll be supplying yourself with your own stock. If you have business acumen, you could look into starting a small business of your own. If not, that's okay. At least you will have a ready supply of fruits and vegetables at any time you want. If you are a fan of homemade jams that they sell in stores, you will be pleased to know that you will be able to make your own, with your own canned fruits and vegetables, and at a lower cost. Canning really is a much more economical option in comparison to buying produce on a daily/weekly basis.

Durability

Cans are able to withstand extreme conditions: heat, cold, wet, dry, etc. This means you can store your canned food in almost any kind of environment without worrying about the condition of the can. What you do need to watch out for, though, are signs of rusting, leakage, denting or bulging; these are signs that could mean that the cans have been damaged and the food has been affected.

Increased Shelf Life

The process of canning, which involves the use of high temperatures and very sterile containers, ensures that any organism that can cause spoilage is destroyed. As long as the container remains intact, the food will remain safe. Once a container is compromised, you have to throw the food out in order to avoid anyone from contracting harmful diseases or infections. Canning is

able to provide a shelf life that can span anywhere from one to four or five years. The shelf life can be longer than this under certain circumstances; some products are known to have a shelf life of over thirty years.

You won't need your food to last for over one hundred years, but it will definitely last longer than a couple of months. Canning is an effective method for families to incorporate into their lifestyles because it saves mothers and fathers from spending money every day on the produce for daily meals. If you are someone who personally grows and harvests your own produce, canning will be a great way for you to preserve your harvest. Having a long shelf life means you can create a food supply without worrying about the food spoiling or rotting in a short space of time.

Rewarding Experience

Canning your own food is also a very rewarding personal experience. It can easily become a skill or hobby you develop for your spare time. Canning involves mental and physical work, which improves your body in more ways than one. It can also be a good experience for couples and families since it is something that can be done as a group. You will get to educate your children on the origins of the food that they eat, and you will also be teaching them a very useful skill that could be passed down in your family. If you are a sucker for old school, canning is also a great thing for you as it will rouse nostalgia within you. Many canners have spoken of the sentimental connection they have developed with canning, because it reminds them of earlier times in their childhood.

It's Eco-Friendly Too

The problem with the produce that is sold in commercial facilities is that the process of preserving them is not environmentally friendly. The facilities that are used to cool produce run on electricity, which is generated by fossil fuels.

We all already know how bad the burning of fossil fuels is for the environment. Produce is also stored in plastic containers which are discarded off after the produce has been consumed. Plastic materials are never good for the environment because they are not biodegradable.

Save room in the freezer.

Most individuals don't have a lot of freezer room, and frozen meat occupies most of it. If we can move those meats out of that valuable area and into a canning jar on the table or shelf, we could use that space for stuff like ice cream. Avoiding the cost of spoiled meat in the event of a power failure is just as crucial. Meat is no longer fit to consume if the freezer level reaches the dangerous level of 41 degrees Fahrenheit for two hours more. Everything in your freezer, including ground beef, pork, chicken, brisket, will have to be thrown out. You don't have to bother about power failures if you can some portion of that meat and keep it at room temperature. The fact is, there are so many benefits to canning meat that it's worthwhile getting over your fear and diving in.

Ability to Purchase in large quantities.

When we come across a great 'can't-miss' price on meat, we can take the opportunity of it by home-canning it. When you buy several types of meat at a discount and can them, you and your household won't have to consume the same meats over and over by getting them out of the freezer before they go bad.

Prevent spoilage in emergencies

We have fuel in our ordinary, non-emergency life. We use it to prepare food, heat, and cool, and we don't give it a second thought. Many folks have a backup plan in case of a power failure, figuring they'll just bring out the camp

stove and gas, then prepare or home can all of the meat in the freezer. Everyone has a plan till they get hit in the gut by a power failure- Mike Tyson!

I'm glad to inform you that if you're in the middle of a long term situation, you'll have a lot more to stress about than canning your defrost meats. Why not take charge of it now, while you have the time?

You're aware of the contents of the bottle.

There are no secret additives when you can meat at yourself. You are sure of what goes in and out. Would you like to reduce your sodium intake? Then leave out any salt or sodium-rich condiments. Is there anyone in the family who has a food allergy? When you can meat, you can avoid adding those additives.

Meal preparation during a power outage is painless and straightforward.

With home-canned meats, cooking during a power failure is simple. They're already fully cooked and healthy to consume, so all we have to do now is add them to any recipe we're making and heat it. There are no long cooking durations, which waste valuable alternative fuels. Another alternative is to rinse the meat and utilize it in a simple household meal like chicken salad.

helps you save money

The cost of canned meats at the food shop might be pretty high. A tiny tuna-sized can of chicken (10 ounces) costs roughly \$3 where I stay. Getting canned meats for my big household gets expensive, but I can bottle an entire quart (2 lbs.) of chicken for roughly \$3.00. I purchase chicken in quantity for under \$2 per pound and occasionally even less.

Satisfaction

In a society where practically anything can be outsourced, there is much to be said about the satisfaction of doing things yourself. Whenever you add new talent to your repertoire, your self-reliance grows. Even better, you may now transfer your knowledge and skills to the subsequent generation. Our primary responsibility is to provide for our families, and doing so well is a beautiful thing.

There will be less waste.

Jars for canning exist in a variety of sizes. Use the portion size that your household will consume in a single meal. We use either quarts and pints for chicken and beef at my home since occasionally the supper is for the whole family. On other occasions, the kids are out enjoying kid activities, and its just mommy and daddy and the baby at home.

Protect the environment.

We're not saving the environment, but because canning jars are reusable, we're not adding to the waste by using cans. If you purchase new can and lids when you start house canning meat, it will be an investment, but they may also be acquired through yard sales, thrift stores, or simply asking about your area. You might be able to discover an old friend who is willing to give their jars to those who will need them.

Save time

Thanks to the properly prepared meats from home canning, we've saved a lot of time on dinner prep. Although canning the meats takes time at first, it is a targeted and productive amount of work scheduled for the day. I would open a can of prepared chicken or ground beef at suppertime, which makes meal prep so much simpler and faster.

Since we're on the subject of canning and time saving, one of the simplest

products to can is meat. In most situations, you'll place raw meat in a canning jar, add some broth or water (depending on the meat), and pressure can the jars. It doesn't get any easier than this.

Where to Purchase Canning Supplies

Canning supplies are available across the country, in all kinds of stores. The first place to check is your local hardware store. Most hardware stores will carry canning supplies year round and have a good variety of jar sizes and tools. Larger hardware stores like Home Depot and Lowe's also carry canning jars and tools.

You can check your local grocery store; however, grocery stores tend to only stock canning supplies during canning season. The same can be said about home goods stores such as Bed Bath and Beyond and Tractor Supply.

Big box stores like Target and Walmart also carry canning supplies during canning season. If you are lucky, they may also have a few shelves of jars in the off season hidden in the aisles. These stores often have good deals on jars as they can purchase in bulk and pass the savings on to you.

You can also purchase your canning supplies online and have them delivered directly to your door. Amazon has all types of jars available and they will run coupon specials during canning season, giving you a great price on the jars. The companies that make the canning jars, such as Ball, have their own websites where you can purchase jars and accessories. Many of these company-owned sites will have unique canning tools since the product is coming straight from the company.

Many people have had success finding jars at yard sales or thrift stores. People looking to get rid of their canning jars may bring them to a second-hand store in order to make space in their own cabinet. When buying previously used jars, you should always check for chips or cracks before using them for canning.

Be sure that your canning supplies are up to the most current canning safety

standards. While you may want to use your grandma's old double hinge jars to preserve foods, it may not be the safest option. Be sure you have a canner that is in good condition and equipped with all the newest safety features.

Website Authorities

There are a few websites that are considered authorities in home canning. It is a good idea to look at these sites periodically to see if any new canning advances have been made.

The first site is freshpreserving.com which is owned by the company who makes Ball and Kerr jars. This site contains tried and true recipes, general information about canning, a store to purchase canning supplies and a forum for home canners to talk and compare recipes and experiences. This is a user-friendly site for anyone, whether they are an experienced canner or a novice.

The National Center for Home Food Preservation is a government-owned website that will give you lots of scientific information about canning at home. If you are interested in the science behind canning and preserving, this is the site for you. There are also many detailed recipes to try. Find it all at nchfp.uga.edu.

Method of meat preservation

Freezing

It's impossible to go wrong with freezing, except you utilize the unsuitable container or fail to turn on the freezer. Whether you buy meat in large, hunt it, or raise it locally, portioning the cuts and wrapping them in a freezer sheet or using freezer-safe bags or containers requires no effort. Based on the cut and fat concentration, meat kept at 0° F will last longer, but the flavor will deteriorate after four months to a year. When stored in vacuum-sealed containers, the storage life can be doubled or tripled. To avoid freezer damage, eliminate as much air as possible when using freezer sheets or plastic bags. To save storage, stack meat before it freezes.

Freezing has drawbacks. And the drawbacks might be terrible because when it fails, everything fails at the same time. When the electricity goes off, or your appliance fails, you may not notice until brown-reddish fluid oozes from the inside and blowflies swarm near the source of the foul stench. Many homesteaders have found out the hard way that relying only on a freezer is dangerous. Examine your appliances regularly to make sure they're fully functional. If the door isn't opened, food in a fully loaded freezer can stay frozen for up to a week, giving you enough time to contact a repair service or rescue the food.

Freeze drying

Freeze-dried foods are one of the greatest survival foods, and they may be organized into single meals that fit within a jar, ready to be hydrated and cooked. The most convenient way to use this meat preservation technique is to get a freeze-drying device that takes care of most of the work for you.

Place fresh or prepared meats on the unit's trays by slicing them. The

temperature is then dropped to -30° to -50°F, creating a vacuum around the meat. In this vacuum condition, the meat is slowly heated, and all of the liquid in the meat is converted to water vapor and sucked off.

If you don't want to spend extra cash on a freeze-drying machine, you can freeze-dry using a deep freeze, dry ice, or a vacuum chamber. Some of these procedures can take up to a week and risk freezer damage, resulting in foods that can be dried and kept in pantries.

Dehydrating

Drying meat on smooth rocks in the sun, handcrafted hanging racks, and using electrical equipment is one of the ancient meat preservation techniques. However, a dehydrator can be acquired for less than \$40 new or considerably less if bought used. Jerky is dried meat that has been steeped in brine and seasonings before being dehydrated. When mastering how to cook venison, it's common also to learn to create jerky.

Because residual fat can rapidly turn sour and destroy the whole food, dehydrate the thinnest slices of meat and extract it. Slice finely for faster processing; freezing the cuts ahead of time will help you get the thinnest slices possible. If you're making jerky, soak it for up to 24 hours in acid fluids like vinegar, honey, or beer, along with your selected spices.

To maintain safety, University cooperative extensions recommend pre-cooking meat before dehydrating it. Boil for at least 10 minutes in a preheated oven at 275°F or steam/roast to an internal temperature of 160°F. Preheat the oven to 165 degrees Fahrenheit. Place the meat in a straight line on the racks of a food dehydrator and dry at the highest level. Make sure the internal temperature is at least 145 degrees Fahrenheit. Allow four to six hours for drying before storing in sealed containers.

Although frozen meat usually lasts a year, pairing it with dehydration can extend its storage life to several years. It also helps to preserve space. Just dry your meat as directed above, vacuum seals it, and freeze it.

Curing

Nitrates have recently earned a poor rap. This is partly because huge amounts of sodium nitrate are hazardous. It is, nevertheless, required for curing meat because salt does not eradicate the risk of botulism, whereas sodium nitrate does. To apply this meat preservation approach, look for "curing salts." Due to the additional dye, these are referred to as "pink salts," however they are not similar to Himalayan pink salt.

Dry-curing entails mixing the curing salts with table salt and spices, dry-rubbing meat like pig belly to maintain even covering, and storing in the refrigerator for up to a week. The meat is then carefully cleaned, wrapped in cheesecloth to put pests at bay, and stored for up to eight weeks in a cool, dry area such as a walk-in refrigerator.

Combine a brine with water, table salt, curing salt, spices, and optionally brown sugar to wet-cure meat. For every two pounds of meat, the meat is brined for a day. For large hams, this can take up to a week. Strain the meat on a mesh screen for a day after carefully cleaning it, then store it for up to a month. After smoking, a cured ham becomes much tastier.

Hoof

Have you ever pondered why beef, pork, or venison are the most common classical cured or dried meats? Chicken and rabbit sausages do exist, but they are more uncommon. This is because curing and drying were required for bigger animals.

The simplest way of meat preservation is to feed the animal alive till it is

consumed. Rabbits, chickens, and geese can sustain a family for one supper and reach butcher size in a matter of months. "Fat calves" were kept for important events when a large group of neighbors or family could share the animal, and hardly anything went to waste. In the parable of the Prodigal Son, the father requested the bigger calf to be butchered to celebrate his son's return.

Families who live off the grid may not have the resources to operate multiple freezers to preserve their animals until they are needed. The difficulty of discovering alternate meat preservation methods for cattle or pigs is avoided by raising smaller, more sustainable animals. Smaller animals also enable homesteaders to grow more meat without requiring much land.

If all grownups have a full-time job, raising animals "on the hoof" may not be possible. It takes effort to butcher, prepare, and brine meat.

If power and appliances are more restricted than food or grass, raising the animals alive for a longer period may solve a storage space challenge.

Drawbacks of the canning method

Although canning has several benefits, it also has some drawbacks. Although the advantages supersede the disadvantages, knowing the weaknesses and risks is important.

Glass jars are prone to breaking.

Seals can be damaged, resulting in food spoilage.

Canning takes a long time.

When jars refuse to seal, spoilage occurs. However, insufficient preparation or poor hygiene can lead to *Clostridium botulinum* contamination, which can be fatal. It's always a good idea to strictly follow the directions that came with your canner.

The majority of canning is made in the summer, which raises air conditioning expenses.

Canned food does not have the same flavor as fresh food.

Canned food has a lesser nutrient benefit than fresh food. Freshly harvested mature fruits and vegetables have 65 percent higher vitamins and minerals than canned fruits and vegetables.

It also necessitates substantial time and financial effort. Using canning tools only once or twice a season may not be sufficient to cover the equipment's expense.

Canning jars that have been filled are large and weighty. Storage of such jars necessitates the use of heavy-duty shelves. They're also cumbersome to transport from one place to another.

Canning Do's and Don'ts

Canning is relatively simple but when not done properly, it can result in disastrous consequences. For you to truly be a master on this very important skill, let me provide you with some canning dos and don'ts that you'll surely find helpful.

Be Organized

Did you notice that in both water bath and pressure canning methods above studying the recipe is always the first step? This is because knowing what to do keeps you organized. You have to be organized when preserving food since it could help your work go smoothly and canning should be done as quickly as possible.

Spices and seasoning only as specified

Do you know that spices and seasoning are usually high in bacteria? Having too many seasonings and spices on your food beyond what was required in the recipe could be unsafe.

Overripe fruits and vegetables are a no-no

I have mentioned this before but let me just reiterate this for you, canning can increase the life of the food but it certainly couldn't increase its quality. Canning overripe fruits may become worse in storage.

No butter and fat ever

You should not put these two in your home canned products as they do not store well. Adding them to your product will only decrease the food's life. In addition, butter and fat slows heat transfer during the processing time which can result to an unsafe preserve.

You can go smaller but not bigger

When it comes to the size of jar you should use, if you can't stick to the jar size on the recipe, then you should pick up a smaller jar than getting a bigger one since this can result in an unsafe product.

The higher the altitude = longer processing time

In high altitudes, the boiling point is of lower altitude. This is why you have to increase the processing time to compensate for the lower temperatures at an altitude above 1000 feet.

Hot and cold do not go well together

Indeed, hot and cold do not go well together especially when it comes to jars. Abrupt changes in temperature would certainly result in breakage so here are things you should remember: if the food will be hot when placed in the jar, your jar should be preheated and the water in the canner should already be heated to. If the food is cold, do not preheat the jars, just sterilize them. Also, put the jars before turning on the heat on the canner so that the water and the food can be heated together.

Safety first before removing jars

After the processing time, jars will sure to be hot in both the water bath and the pressure canning method so you have to make sure to handle them carefully. You can use a footstool to avoid tiptoeing while removing the jars because that could be dangerous!

Patience on seals

After removing the jars from the rack and putting them on a paper towel, avoid moving them or you will be interrupting its sealing process. Just leave them be or else put the jars in a place where it wouldn't be disturbed the moment you take them out of the canner.

Write the details down meticulously

I'm just talking about the labels on the jars. Remember to always attach a label to each jar and write down the recipe and the production date. This is the best way to keep track of the life span of the food.

To be truly a master of something, you have to work hard on it to.

Knowledge of the steps in canning and preserving plus the additional tips I mentioned would not be enough to create a canning master in you. You have to work hard on it too. As always, practice is the key!

Canning Jars (Standard)

Use conventional canning jars, which usually have the company's name or the word MASON written on the side of the jar. Mayonnaise, pickle jars, or Peanut butter, for example, may not be able to sustain the 10-pound pressure (240 F) required to can vegetables. Check the jars for chipping or cracks if you're utilizing conventional canning jars you already have. Examine the jar's mouth with your finger to check whether it has any fractures or cracks. The jar will not seal if this happens. If treated properly and without nicks or fractures, jars may last for years.

To avoid shattering the jars, clean and rinse them by hand shortly before filling them with hot vegetables or other produce. Preheat the jars until you're ready to fill them with hot products. Preheat the pressure canner or the water in it to put the hot jars in it right away. If the water is not heated, this lowers the time required for the canner to get up to pressure.

Add at least three inches of boiling water to a seven-quart pressure canner to get it set for processing. (If you have a larger canner, you'll need additional water; see the manufacturer's directions.) Put the canner on the stove unit to heat and place the rack on the base of the canner.

Lids for Canning

The 2-piece lid, which consists of a screw band and a thin metal top, is the best option as thin metal tops cannot be used again and again. Before putting the lids into the jars, read the manufacturer's directions on how to handle the lids that came with them. Some conditions need heating, while others do not.

Chapter 2: Method of canning meat

You can choose raw or hot packs, but both will result in pressure canned meat. The raw pack is usually misunderstood as a boil, and the hot pack is commonly mistaken as a pressure canned technique, but this is incorrect!

Raw/cold pack

Simply inserting raw meat cut in cubes into a safe and sanitized jar is all it takes to pressure can meat with a raw pack. Many of the air bubbles inside the jar are removed by squeezing the meat down to the appropriate headspace. Apply the lid to the jar after cleaning the rim with vinegar-soaked tissue or paper towels. Now, fill your pressure canner with the jars and the appropriate quantity of water, and begin by letting it vent heat for 10 minutes before adding the jar and getting it up to pressure.

When raw packing meat for pressure canning, you'll notice that no extra water is used. It'll make its broth on its own.

Proteins stick to the edge of the jar when using a raw pack, and they must be thoroughly washed away.

Don't raw pack in pint normal mouth-sized jars if you don't have a nice cleaning brush to get deep in. The raw pack technique works well with wide opening pints and quarts. I put raw meat in 8 oz. jelly jars with straight sides and a narrow opening. It's considerably simpler to wash than the bigger jars with rounded shoulders.

According to researches done, some people have concluded that the raw pack method:

Saves you preparation time;

Because the meat shrinks during preparation, your jars may appear to be

25% empty.

During preparation, the meat may emit more surplus fat. Surplus fat may flow to the surface of jars, causing an unattractive appearance and perhaps turning rotten over time. (However, particularly in extra-lean minced beef, you'd be shocked at how much fat there is.)

Some claim that jars containing raw-packed meat are more difficult to wash afterwards.

According to North and South Dakota Extension Services,

“When loading jars with raw meat, don't pack them too tightly. A loose pack is when you fill the jar with air. Using the palm of your hand, carefully tap the base of the jar after putting raw meat in the jar and gripping it with one hand. Set a folded kitchen cloth or pot pad on your countertop and tap the jar strongly on the cloth or pot pad. Keep adding meat and tapping the jar's base until the appropriate head space is achieved. Do not squeeze the meat into the jar too tight.”

Hot pack

When packaging meat in jars, everything must be hot, as well as the jars themselves. You'll also have to fill the jar with hot water or broth. When it comes to pressure canning meat, hot-packed meat will maintain its form more when used in a meal.

Meat is fried till it is partially cooked when it is hot packed. It will then be placed in the jar and filled to the required headspace with boiling water—this aids in the preservation of the meat's shape and appearance in the jars. The jars will be considerably easier to wash because no proteins from the meat will attach to them.

Be certain that you have the pressure canner water hot when you bring the

hot packed jars of meat to it.

According to researches done, some people have concluded that the hot pack method:

Since the meat has shrunk during precooking, you can put so much in the jar; It offers the possibility to burn or brown the meat, generating flavor buttery flavor on the skin of the meat;

Most don't like the mouthfeel of the hot pack with all meats: they say that with more tender meats such as chicken, browning it first can make it stringy.

Note: There is no alternative when it comes to ground meat of any kind: you must do a hot pack by either sautéing the ground meat first or forming it into patties and sautéing those as well. The reason for this is density: raw ground beef would clump together and inhibit even heat transfer through the jar. The ground meat isn't entirely cooked; it's only sautéed until it doesn't form a dense mass in the jar. It's fine to make patties or meatballs (they allow heat to flow around and between them.)

Some useful tips for beginners

Before you begin, gather all of your equipment and supplies. It's awful to learn midway through a process that you're out of some ingredients (has happened to me before) or that you can't locate your jar lifter when the jars are set to be removed.

Give yourself plenty of time! Canning is a delightful pastime, but it is unquestionably time-consuming. When you're in a hurry, the fun fades rapidly, and the situation becomes increasingly unpleasant. I have a basic policy that I don't can on weeknights; I leave it for the weekend when I have more free time.

The first error individuals commit while pressure canning is altering the recipe. This is one case when you should adhere to the recipe as precisely as possible and only apply recommended canning recipes for preservation. Don't tamper with science; there's a huge science behind ensuring adequate acidity in the food to prevent bacteria from ruining it. Ensure you're following food-safe procedures to ensure you're staying within the right pH and consistency standards for the item you're canning.

Do it with a mate! Washing, drying, and cutting meat, as well as boiling and canning it, is a lot of effort. When you have company, time passes more quickly.

Learn from another who has more expertise than you if you have the opportunity. My grandmother showed me how to can, and asking questions when you're a novice to something is quite beneficial.

The next pressure canning blunder is overfilling the canner. Regardless of how many containers you're canning, don't ever load your pressure canner with far higher above two inches of water from the base. Water bath canning,

on the other hand, necessitates submerging the jars. When pressure canning, your containers should never be filled with water up to the necks, and worst of all, covering their lids.

Overlooking headspaces requirements: There's a purpose why different types of canning require different amounts of headspace.

The headspace (or open space) guidelines are in place to guarantee that your food is properly sealed. In order for the jar to be properly sealed, many recipes need at minimum one-inch headspace at the top.

Another common error made by beginners is speeding up the procedure by cooling or releasing pressure very soon. It requires a lot of time for the canner to cool down to room pressure when your processing time is over, so you'll have to wait a little while before you can remove your jars.

This is an important step in the canning technique, so don't rush it by pressing the jiggle, bringing out the weight, or submerging the whole canner in ice water.

Placing your pressure canner in water changes the pressure too rapidly, which can damage your seals, shatter your jars, or even destroy your pressure canner.

How to Properly Clean & Sanitize Canning Jars

There are several safety considerations to follow if you plan on canning your meats. Washing and sterilizing your canning jars thoroughly is an essential step. Improperly conducting these steps or utilizing non-safe cleaning products—can lead to serious health issues. Cleaning products that are free of harsh chemicals are considered safe. Safe detergents will not contaminate your canning jars and food.

Materials for cleaning and sanitizing canning jars

You will require the following materials to successfully clean and sanitize your jars. Some of them are almost certainly present in your kitchen.

- Basin or bucket
- Dishwashing liquid
- tongs
- vinegar (white)
- Fresh dish towels
- cloths for cleaning
- Pressure canner

Cleaning

You should properly wash and clean your canning jars before sterilizing them. If they've remained resting on a dusty rack without their lids, you'll need to use a clean cloth to remove any dust and dirt.

Dip your jars in a bucket or basin full of heated water and white vinegar if they have scaling or hard-water film on them. For every gallon of hot water, add one cup of white vinegar. Leave the jars to rest in this solution for a few hours before commencing the cleaning procedure.

You could wash your canning jars manually or put them in the dishwasher. In any case, ensure all soap residue is removed. Any food item you want to can be ruined by leftover soap, causing an unpleasant taste.

Sterilizing

Just like meat you can, the jars and lids may carry bacteria that might thrive and destroy your meat. As a result, all canning tools must be adequately sterilized. According to experts, sterilization is only required for water bath canning less than ten minutes. If your recipe requires a 10-minute or lengthier preparation period, the jars and lids will be disinfected along with your food.

The best technique to sanitize jars and lids for pressure canning is to use the canning method itself. It's necessary, to begin with, to clean jars and lids; however, the extra sterilizing step can be skipped.

If you want to sterilize jars, the National Center for Home Food Preservation recommends doing so as follows:

Set the washed jars right-side-up on a stand in a canner and load the jars and canner with water to one inch over the tops of the jars. Bring the water to a boil and then boil for 10 minutes at altitudes under 1,000 feet elevation. For every 1,000 feet, you gain in elevation, add one minute. Retrieve the jars one by one when you're set to load them, pouring the water back into the canner. This will leave the canner hot enough to process filled jars.

Cleaning Your Canning Jars' Lids and Screw Bands

Would you also need to sanitize the lids and screw bands on the canning jars? No, but give attention to this crucial caution. The lids, made of metal and rubber, are not reusable, contrary to popular assumptions. Each moment you can food, they should be changed.

Because the screw bands are never in contact with the food, they do not have to be renewed. Instead, hand-wash them with heated water and little droplets of liquid dish soap.

After washing screw bands, the first crucial thing is to ensure they are totally dry. Use a dry cotton kitchen napkin for this, then turn it upside down on an additional clean kitchen napkin for a few hours before using it. This will aid to avoid rusting on the bands.

Jars should be tested for proper seal.

After cooling for 12 to 24 hours, the jars must be checked for satisfactory sealing before being kept. Loosen the screw bands and inspect the seal using one of the procedures below.

Using a finger or thumb, apply pressure at the middle of the lid. The lid is correctly sealed if it does not shift down or up.

Take the jar by the lid and lift it. The container is correctly closed if the lid stays on without releasing. When verifying the seal, place a hand underneath the jar to hold it if it loosens from the lid, or put it over a table lined with a napkin for padding.

Picking up the jar and looking at the lid at eye level is an alternative to verify the sealing. The jar has correctly sealed if the lid is somewhat bent downwards in the middle.

Test the seal by knocking the middle of the lid with the base of a tablespoon. If it generates a high-pitched ring tone, the jar is fully sealed. If it creates a low bang, the jar may not be well sealed, or there could be stuff at the top of the jar meeting the lid. Pick the jar and inspect the top to see whether there is any food in contact with the lid. If it is, you should use one of the alternative strategies to test for a clean seal.

If any jars are not securely sealed, they can be modified to seal them. Loosen the lid and inspect the rim of the jar for scratches if needed. If the jar has a tear, transfer the substance to a clean jar and make a new lid to sit on top. Reprocess in the same manner as before. Reprocessing will result in an output of lower quality than the initial processed result.

If you don't want to go through the whole procedure for only one or two jars, the unopened jars can be refrigerated and used within two to three days.

Care and storage of the pressure canner

Wash the rack and canner inside and out. Dry completely and lay torn newspaper or paper sheets in the pot's base to retain moisture during storage. Insert the rack into the canner.

While washing the canner lid, take special caution to avoid denting or bending it. To clean the gasket, remove it. Carefully dry the lid and gasket. Look for any evidence of damage to the gasket. Change the gasket if it is cracked or damaged.

Because the dial gauge should never be covered in water, pressure canners with a non-removable cover with a dial gauge must be maintained by cleaning the cover off with a moist towel.

The following season before utilizing the dial gauge, keep a record of getting it examined by the local County Extension Office. Remove safety valves and petcocks if they are detachable to be properly washed and dried. To make sure the vent or petcock is clear of dirt, draw a rope through it.

Turn the cover upside down on the pot and put it in a dry area to store the canner. When storing the canner, do not close the lid. Other canning equipment and tools should be stored in the exact place as the canner so that everything is simple to find when the subsequent canning season commences.

Pressure Canners - How to Use Them Safely

If the pressure canner possesses a dial gauge, it should be examined for reliability once a year before using it. The gauges can be evaluated at most local County Cooperative Extension offices. If the gauge is inaccurate by more than one pound at 5, 10, or 15 pounds of pressure, it should be changed since it may result in inappropriate processing. Before usage, clean all pieces, such as the vent, safety valve, and lid and canner edges.

Time for Proper Processing

The meals must be processed for the appropriate amount of time to confirm that all germs have been effectively killed. Make sure to modify processing timeframes if you're in a high-altitude area.

What are the factors that affects processing time?

- Acid level
- Size of the food cuts
- Jars' original temperature
- Is the meat boneless or has bones?
- Size and structure of the jar
- Viscosity
- how tight is the food is arranged in the jar?
- The temperature the food is being processed

Inspect for Spoilage

Before utilizing canned goods, make sure they are thoroughly inspected for any signs of rotting. Botulism is caused by *Clostridium botulinum*, found in damaged canned food. It's a great habit to inspect your canned foods for symptoms of spoiling on a routine basis but double-check them before usage. If the food shows indications of spoilage, it should be discarded correctly.

If you're not certain a food is spoilt, do not try to evaluate spoilage by tasting it; instead, toss it in the trash to be safe. The list of indicators of rotting that should be checked before utilizing canned foods is listed below.

Check to ensure that the jar's lid is securely fastened. The jar has an excellent vacuum seal if the middle of the lid is concave.

Check for new leaks or traces of dried food on the jar coming from the top.

Look for discolored areas. It's a sign of rotting if the content is dark in color. If the meal has a mild discoloration, it might be due to mineral elements, in which case the contents are still good.

It is spoilt if the contents are slippery, shriveled, or hazy in appearance.

If the contents of the jar spill out when it is opened, it should be thrown.

Scan for any indications of mold after opening the jar, which might be whitish, blue, greenish, or black in color. Inspect both the bottom of the lid and the contents of the jar for indications of mold.

Sniff the contents; they should be thrown away if they have an off-putting odor.

Getting Rid of Spoiled Food

The jars of food must be appropriately disposed of if it has been confirmed that the canned items have spoiled or are likely to rot. If the jar is still sealed, put it in a disposal bag, securely wrap the bag around the jar, and dispose of it in the ordinary trash. The food should be detoxified before discarding if the jar's seal is damaged, the jar is spilling, or the jar has been unsealed. To detox, follow the instructions outlined below.

Fill a pot with the contents of the jar. If the ingredients are rather thick, add additional water to make it simpler to boil.

Put the lid, jar, screw band (if applicable), and any additional utensil that got into touch with the damaged food in a separate pot. To cover the jar with water, turn it on its side if required. Fill the container with enough water to fill the objects by at least one inch.

Bring the water to a boiling state in both pots—Cook for 30 minutes at a full boil.

Throw the contents of both pots in a thick trash bag and seal it securely when they have finished boiling. Try to get rid of the bag and contents appropriately in the waste.

Scrub the table and any areas connected to the food or jars with warm, soapy

water. Any brushes or towels used in the cleaning should be thrown in a thick disposal bag, sealed firmly, and thrown away.

Hands should be washed properly with hot, soapy water.

Canning Storage

After testing for a proper seal, wipe off any residue on the jars and lids.

Label the jars with the contents and the date of processing. Apply a label on the jars to write the data on, or write on a piece of masking tape. On the surface of the lid, a black marker may be employed to write the item and date.

Keep the jar in a dry, cool, and dark area. The lids may rust if the region is moist, weakening the seal. The appearance and taste of food will be affected if it is subjected to many light or warm temperatures.

Temperatures should be kept between 50 and 70 degrees Fahrenheit. Cans of food ought to be kept for roughly a year before losing their quality if preserved properly.

For the finest appearance and taste in canned foods, choose a high-quality food clean of blemishes, at peak maturity, and not infected.

When processing food for canning, it's crucial to avoid exposing some foods to too much air because they can have dark colors.

The number of canned products you will consume within a year should be canned to preserve them fresh year after year.

Canning should not be done in commercial jars, such as mayonnaise jars. They are poorly sturdy and will fracture or shatter more often during preparation.

Wash the jars in the dishwasher if the preparation time is greater than 10

minutes. During the processing, they will be sterilized.

If you're using spices to flavor your meal before canning it, tie them in cheesecloth instead of placing them straight into the food. This allows them to be taken out before the canning process begins, preventing the food from being too flavorful or colored due to the spices.

Because dried herbs are harsher than fresh herbs, reduce the amount by about 1/3 if dried.

If you're at a higher elevation, be sure to adjust the processing duration in accordance with the Processing Temperature and Time tables. Water boils at a reduced temperature at higher elevations, necessitating longer processing time.

Do not fasten screw bands after processing.

Chapter 3: FAQs

Is there a canning class or course that you can enroll in as a novice who is interested in taking this ability to the next level?

Anyone who wants to can or preserve food does not need a formal degree. If you want to learn more advanced canning techniques, canning courses are often given at various locations such as grocery shops, kitchen supply stores, culinary schools, community centers, and, on occasion, even libraries.

This course is also available through correspondence, so you may wish to check for that option on the internet as well. Pay close attention to websites or publications that educate you how to can food safely. Some of these articles may include thoughts or proposals that are in direct conflict with USDA guidelines and recommendations. Whenever in doubt, consult the USDA handbook or speak with a qualified professional.

How long does canned food have a shelf life?

Foods that have been properly packed, kept in a cool, dry environment, and show no indications of rotting on the interior or outside are deemed safe to eat for at least one year after being opened. Cans of food kept near an oven, in indirect sunlight, in an oven, or in any other heated environment will, nevertheless, have a shorter shelf life.

You should eat it within a few weeks to a couple of months at the most, according to the manufacturer. When jars or cans are exposed to moisture, they corrode, resulting in leaks that can lead to contamination of the food and its ingestion by unqualified people.

One of the recipes called for the use of pectin, which was used to create jam.

Is it possible to remove pectin from a recipe if a person does not want to utilize this ingredient?

It has been emphasized over and over again throughout this book how important it is to follow recipes exactly as written. If you want a flawless outcome, don't make any changes to the recipe, including decreasing, removing, or adding ingredients. There are numerous trustworthy recipes that do not call for the use of pectin that you may discover online. Instead of attempting to alter the recipe, make use of them.

Is it possible to process two layers of jars at the same time?

Yes, it is possible to do this. All of the advantages would apply to the jars in the top layer as well as those in the bottom layer. The temperature is uniformly spread throughout the jars, ensuring that all jars in both the top and bottom levels are safe. All that is required is that you create a grid between the layers in order for water and steam to flow around the jars.

Also, when using the water bath canning technique, be sure that the water level in the top layer of the jars is at least an inch over the tops of the jars. If you are using a pressure canner, the water level should be 2 to 3 inches over the bottom of the can. Maintain strict adherence to the processing time and temperature specifications at all times.

Some of the liquid from the contents is lost during the procedure. What should be done in this situation?

If the amount of liquid lost is small, there is no need to be concerned. The food will not deteriorate, and the seal will not be compromised in any way. However, it is possible that it may produce a little discoloration of the meal, although this will be minimal. The best you can do, however, is refrigerate the liquid and consume it within 2 to 3 days if the liquid loss is more than half of the original quantity.

What exactly is kettle canning, and is it a safe method of

preserving food?

In this technique, the meals to be preserved are boiled in a standard home kettle before being placed in the freezer. Once this is completed, the items are placed into heated jars and sealed. In this technique, it can be observed that there is no processing done at all.

Furthermore, while utilizing the kettle technique, the temperature is not high enough to completely destroy any dangerous germs that may be present in the food. In addition, when food is transferred from the kettle to the jars, germs may infiltrate the food and cause spoiling or worse, food poisoning, later on in the cooking process.

Therefore, the food's quality and safety cannot be guaranteed. The USDA does not advocate using the kettle technique for canning since it is very time consuming.

What causes some jars to shatter during the canning process?

There are a variety of factors that contribute to breaking during the canning process. Here are five compelling arguments:

The glass in the jar has not been tempered in any way. Toughened glass, also known as tempered glass or toughened glass, has gone through a procedure that has improved its strength and capacity to withstand heat when compared to normal glass. Make certain that the commercial food jars you purchase are designed for home canning before purchasing them.

Two other reasons are that jars with hairline cracks are being used. These fissures are so little and inconspicuous that they may easily be ignored or disregarded. During the processing period, such jars would not be able to resist the high temperatures.

Failure to place a rack on the bottom of the pot or canner may also result in

the jars cracking.

Pack the newly prepared food in ice-cold jars. In certain cases, breaking may be caused by a temperature differential between the food and the jar.

Consequently, it is suggested that the jars be kept at a warm temperature before to being filled with hot food.

Jars containing uncooked or raw food that are dropped straight into boiling water may shatter as a result of the rapid shift in temperature. It is preferable to start with hot water and let it to come to a boil after a few minutes of heating.

Is it possible to can food for individuals who follow a particular diet?

Some individuals are unable to eat canned goods because of medical problems that prevent them from consuming specific components such as sugar and salt. Due to the impact of elevated blood sugar levels associated with simple sugar consumption in diabetics, sugar is not advised for them.

When it comes to individuals who have cardiovascular problems, salts are always restricted since they may cause an increase in high blood pressure because more water is retained in the body as a result of the salts' presence in the body. Canned meals, on the other hand, may be prepared for these individuals even in the absence of salt or sugar. However, the color, texture, and flavor of these canned goods will be distinct from those that include sugar or salt, as is to be anticipated in this situation. Other individuals find these canned meals for special diets to be less acceptable and more unappealing than they would like.

You may also preserve and can normal fruit that hasn't been treated with sugar. Choosing firm, fully ripe (but not overripe) fruit of the highest quality

is the key to success. You may use unsweetened fruit juice or plain water for the sugar syrup if you want. Another method is to mix some of the same fruit that will be canned. Essentially, this will act as a syrup or juice for the canned food. Fill the container halfway with the blended fruit, then top it up with the solid fruit. Sugar replacements may be added towards the end of the cooking process to make it more appetizing.

If you want to can vegetables, meats, shellfish, or tomatoes without salt, follow the directions for normal canning, but leave out the salt. Because salts are not considered preservatives, this technique is allowed, and food safety is still ensured even when salt is not included in the recipe. Salt replacements may be provided at the time of serving to enhance the flavor of the preserved meal.

What do you think the future of food canning and preservation will be like?

Healthier diet and lifestyle choices are now popular all across the globe, and this is expected to continue. Everything "organic" may be found here, including cosmetics, hair products, food, baby goods, and even processed foods, among other things. People prefer "fresh" meals to canned or pre-prepared processed foods from a commercial kitchen.

In this case, canning and preserving fresh fruits, vegetables, meats, poultry, salsa, sauces, and other foodstuffs come in handy. Being healthy and contemporary are combined in one one package to create something really unique. It satisfies the criteria of being nutritious while being fresher for a longer period of time on the shelf or in the pantry. It is ready to eat, which meets the need for convenience while also saving precious time and effort.

People are becoming more and more interested in canning and preserving food. Because of excessive and needless food waste now, the danger of not

having enough excellent food to consume in the future has been alleviated via the use of canning technology.

Conclusion

As a result of canning your food on a regular basis, you will notice an overall reduction in the amount of money you spend on vegetables and other canned goods. In addition, canning at home will have a beneficial impact on your eating habits. The foods you can will be much healthier than those available in stores.

You can buy more locally and seasonally when you can your food, and enjoy those items year-round, even after they've gone out of season.

Canning is one of the most effective ways to share delicious food with your family, friends, and neighbors. Once you get started, you are likely to become addicted to it.

Be aware that you will make mistakes the first few times, but that is to be expected! After all, you are a complete beginner.

BOOK 4: WATER BATH CANNING FOR PREPPERS



Introduction

This method of properly preserving foods uses high heat and pressure as two-part barriers for keeping bacteria out of food, typically done in a boiling water bath canner. Food preserved using this technique retains its natural color, flavor, nutritional value, texture, and other properties. Water bath canning is one of the safest ways of preserving food. Canning is a method of food preservation that uses heat to destroy microorganisms that cause food spoilage and the growth of harmful bacteria. While this is done through heat, it does not cook or pasteurize the food. Instead, it creates an acidic environment that inhibits the growth of food-spoiling microorganisms.

If you have never heard of water bath canning before, you may be curious as to what it is, and the benefits that are associated with it. Unless you are thinking it is associated with the traditional can-can dance seen in French culture, you could probably take an educated guess as to what canning is all about.

Water bath Canning is a method used to prevent the spoiling of foods by storing them in containers, or jars, which are then sealed securely and sterilized by excessive heat over a scheduled amount of time. The reason for this simplistic yet effective system is to ensure the killing of microorganisms, and deter enzymes that can often contribute to the spoilage of various food items. By adding the extra step of heating the food within the sealed container, it extracts the unwanted air and creates a vacuum-like seal to protect it from outside contaminants. Both uncooked food and cooked foods can be considered for canning.

Another thing to take into consideration is your altitude level. We will not get into a geography lesson here and now... but the importance of knowing where you are located will help you to understand the temperature at which

you should boil your cans in order to effectively kill bacteria. Here is a chart to give you a better visual:

Lastly, you have to figure out the acidity of the foods you are attempting to contain. Meats, seafood, poultry, dairy products, and all vegetables are considered to be low-acidic foods. Therefore, pressure canning should be used for them. Fruits, jams, tomatoes, pickles, sauces, vinegar and condiments are considered high-acidic foods, so water bath canning should be used for them. All of these foods are at risk of attracting *Clostridium Botulinum*, which is a fancy scientific word for spore-forming bacteria that increases molding and can introduce unwanted diseases into the human body. It sounds terrifying, but that is why this book is here to teach you the proper steps to avoid this bacterium. Now that we have a basic overview of canning, let's move on to the specifics of the different methods.

Since the invention of glass jars with ground glass joints, cooks have preserved food by hermetically sealing it in sterilized jars. Water bath canning was invented independently in other countries around the same time, such as France and Australia. This process has become known as canning. Water bath canning is a method of processing canned foods in which jars are filled with raw fruits or vegetables that have been precooked by blanching or boiling and then immersed in boiling water to cover for some time, such as 15 minutes.

Water bath canning is a technique that is used to preserve high acidic foods. This preservation method involves boiling water that is poured over the top of the food in a jar. Then, the pots are submerged into boiling water for an allotted time before they are removed and allowed to cool down. The food in the jar is sealed with a lid. The food is heated through the boiling water and then cooled through the cold water. This method is used to process foods that

have high acidity to prevent harmful bacteria from growing.

Water bath canning is a safe and easy way to begin preserving your food simply and effectively. This book will focus on water bath canning fruits, vegetables, jam and jellies, and much more. There are various advantages that you will have when you begin preserving your foods—in addition to saving money. You will be able to prolong the growing season since you can use products that would not be ripe or mature at certain times of the year. You will also customize the recipes to make your food taste exactly how you want it.

Chapter 1: Understanding Water Bath Canning

The process of Water bath canning is when you boil your food in water for a specific amount of time. This process of water canning is what you would want to use for high acidic foods. The determining factor of what can be considered to be acid food, are those that have the pH of 4.6 or lower.

Basically, your main acidic foods that you would probably use the Waterbath Canning Direction for would be lemons, tomatoes, fruits, pickles, relishes, vinegar and some condiments.

Water bath canning is simple. Jars of food are completely submerged in a large pot of boiling water. The food is boiled in the jars for a short period and then removed from the water to cool. The water in a water bath canner will only reach a maximum temperature of 212° Fahrenheit, which means the food inside the jars will never reach temperatures higher than that. This method of canning should only be used for processing high acid foods.

The reason why you can use water canning Direction with acid food is because the acid is so strong in the food that it blocks and destroys the growth of bacteria, when boiled to a certain temperature.

For water bath canning, you're basically placing your food in a jar, wiping down the rims, affixing the lid to the jar, boiling the jars, and then removing them when it's safe. Here are more detailed Directions: for this canning Direction:

First, make sure your jars, lids, and bands work before you use them. Don't use jars that are chipped, scratched, or compromised in any way. You don't want them to break during the canning process. Wash your jars, lids, and bands in warm water with soap, and dry them. You don't have to do any excessive sterilization. If they are clean, you will be fine.

Heat the jars in hot water while you prepare the food. It should not be boiling water, and you don't have to cover the jars. Simply let them rest in a pot that's half-ful with hot water. This will prevent the jars from breaking when you put hot food inside them.

Prepare your recipe with whatever foods you plan to can. Remove the hot jar from the water, using a jar lifter. Fill the jars with your food, using a large spoon or a funnel. Leave at least 1/2 an inch of space at the top of the jar. Remove any air bubbles by pressing down on the food with a spatula or spoon.

Remove any food from the rim of the jar by wiping clean with a damp cloth. Apply the band and the lid until it is tight.

Place the jars in a large pot of water, allowing the water to cover the jars completely. Heat the water until it boils. Processing time will depend on your recipe.

When it's done, remove the jars and allow them to sit at room temperature. You'll want to leave them undisturbed for at least 12 hours.

You can find these prepping tools at Amazon, Targets, and any hardware and local grocery store. You might even already possess most of these items in your arsenal of cooking ware. Once you make these purchases you will most likely never have to buy them again. Please make sure read and follow this section carefully to avoid any unnecessary mistakes that could potentially be dangerous.

So now you know how to choose the finest components for delicious jams and jellies. You've purchased the necessary materials, and your setup is flawless. It's now time to fill your cupboard with jars of your prepared treats that the entire family will appreciate. At this point, the first skill you'll need

to learn is water bath canning, which will allow you to make shelf-stable jams and pickles that are devoid of preservatives.

Before you begin, keep in mind that water bath canning works best with foods that are naturally rich in acids, such as most fruit preserves, including jams, jellies, fruit preserved in syrup, and most types of pickles. Of course, you should not attempt to make jam without first ensuring that you are using a recipe from a reputable source. This technique should never be attempted with non-acidic vegetables, soup, various stocks, meat, fish, or fowl. These need more complex methods, including the use of a pressure canner. These foods are not suitable for water bath canning.

What is Canning?

Farmers put a lot of effort and time into growing food to meet the basic hunger needs around the world. From winter to autumn, each vegetable and fruit grown has a shelf-life after which they lose their quality, texture, and taste. While purchasing fruits, vegetables, and meat products, you must buy products that can be preserved. Because purchasing sub-prime foods and preserving them is a bad choice. Purchasing foods which are at the stage of freshness are critical for its preservation.

Many people make common mistakes while canning and preserving foods. If you intend to can and preserve food at home, you might be thinking of making your recipe for preserving food and making a jar full of fruits and vegetables to be put and preserved together. Well, a perfect recipe to can and preserve food is designed and tested to ensure that it will not affect the product quality, preserve the product for long-term storage purposes, and serve as a healthy food.

If you tell someone that canning is a complicated and unsafe practice of home-food preservation, you are wrong. You only need to determine the type of method that can be used to preserve foods according to the pH level of the food. The main goal of canning foods is to remove oxygen molecules, reduce or stop the enzymatic activity, and inhibit or kill the microorganisms such as bacteria, yeast, and molds. Because the multiplication time is fast and ranges between 10-30 minutes. But canned foods tend to retain their quality and taste better as compared to frozen foods.

For many decades, salting, drying, brining, and soaking foods in honey are the old traditional techniques used to keep the foods safe for consumption even after months. The food canning and preservation techniques in the guide are a combination of old traditional techniques and practices and new

scientific justifications to offer food to people that is safe and delicious to enjoy even after a couple of weeks and months. Such techniques include water bath canning, pressure canning, and fermentation.

For water bath canning, you're basically placing your food in a jar, wiping down the rims, affixing the lid to the jar, boiling the jars, and then removing them when it's safe. Here are more detailed instructions for this canning method:

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Prepare your recipe with whatever foods you plan to can. Remove the hot jar from the water, using a jar lifter. Fill the jars with your food, using a large spoon or a funnel. Leave at least $\frac{1}{2}$ an inch of space at the top of the jar. Remove any air bubbles by pressing down on the food with a spatula or spoon.

Remove any food from the rim of the jar by wiping clean with a damp cloth. Apply the band and the lid until it is tight.

Place the jars in a large pot of water, allowing the water to completely cover the jars. Heat the water until it boils. Processing time will depend on your recipe.

Water Bath Canning



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Place the jars in a large pot of water, allowing the water to completely cover the jars. Heat the water until it boils. Processing time will depend on your recipe.

When it's done, remove the jars and allow them to sit at room temperature. You'll want to leave them undisturbed for at least 12 hours.

Water-bath canning, often known as "boiling water bath canning," is a more straightforward way of preserving homemade jam, pickles, and tomato paste. You may keep the fresh taste for a year by processing the jars in hot water after the procedure. Water canning is safe for foods that contain many acids or if the recipe contains the correct quantity of acid. Typical foods include:

- Fruits & juice drinks
- Jellies and jams
- Fruit flavors
- Pickles
- Salsa
- Pizza sauce and pasta sauce

How to prepare the jars for water bath canning:

To sterilize the jars, wash them in hot soapy water. Wash them properly and leave them to dry thoroughly on a towel.

When you are ready to begin canning your food, fill a large pot with water and bring it to a boil. Heat the water until it reaches a steady rolling boil (around 180-190 degrees). Pour the canning jars and lids into the boiling water, one at a time, so that they are entirely submerged. Leave them there for 10 minutes. This is imperative in ensuring that your jars are sterile - you'll know it's done when you see steam coming off the jars. If the water isn't boiling, put it on high heat until it is. When the jars and lids have been sterilized, drain them thoroughly, leaving only ¼- to ½ inch of water in the pot. Ladle the water bath into your jars. Take the jars upside down on a towel and let them cool completely, usually about 30 minutes.

To set your jars for water bath canning, follow these steps:

Wash your jars and contents thoroughly with hot soapy water.

Fill hot jars with hot food; never fill with cold food.

Remove air bubbles by sliding a spatula around the inside of the jar. Make sure that the contents are not touching the sides of the jar, as this may cause your jars to break when they are sterilized.

Wipe off any food spillover on rims and threads (where the lid will be screwed on).

Set the lids out of the hot water and screw them on tightly.

Place jars in a steamer or large pot of boiling water.

Boil for at least 20 minutes for high-acid canned food (20 minutes is needed to ensure that all high-acid food is heated to a temperature above the boiling

point of 212 F/100 C, which will destroy any harmful bacteria).

Fill the pot with cold water, bring it back to a boil, lower the heat, and let it parboil for an hour or two.

Take off the pot from the heat, and leaving them upside down, leave it for a few hours. Please do not remove the jars from their water bath until completely cooled at room temperature, usually about 30 to 60 minutes.

How to seal the jars

Pour boiling water over the lids and then allow them to cool. Make sure that they are completely cool before screwing on the rings and putting on the lids.

When you are finished with the water bath, remove the jars from the pot and set them upside down so that the lid is facing up. Label each jar. Store them in a dark place for up to 1 year in temperatures between 65-80 degrees F (18-27 degrees C) under normal conditions. Store them for up to 3 years if you keep them in the refrigerator. If stored in temperatures above 80 degrees F (27 degrees C), they can be stored for only one year. Before opening a jar, make sure it is completely sealed with no jar left unsealed so that none of your food is exposed to air. If your jar remains unsealed after 6 months, don't consume the food in that jar.

Once you reach the end of your food, reseal it in an air-tight container and place it into the fridge or freezer for future use.

Tips for success with Water Bath Canning:

Be sure you sterilize your jars, lids, and rings appropriately by following the proper water bath canning procedures.

When you are ready to begin canning your food, make sure that your jars are completely submerged in boiling water before adding the lids and rings. This is important to ensure that any bacteria in the air are killed by the boiling water during processing.

Make sure that your jars are well sealed before putting them into their water bath. It's best to leave them upside down after the water bath to ensure that they are appropriately sealed.

Always use new lids and rings when you are canning to ensure food safety.

If you're canning larger quantities of food (more than 8 quarts), make sure that you have enough jars for food you're preserving for.

It's essential to use new lids and rings when you begin canning.

Check your temperatures throughout the entire water bath process so that you know for sure that the temperature of your jars is high enough. The ideal temperature for most food preservation is 200 F/93 C, although low-acid foods can be preserved at temperatures as low as 140°F/60 C.

Make sure that your jars are well sealed before putting them into their water bath.

In this process, you will be canning your food in jars using a regular water bath. You will be placing tightly sealed jars into a large pot of boiling water for several minutes. You will then fill the jars with your prepared food and cover them with the lids.

If you are preserving high-acid foods, remember to bring your hot-filled jars

to a boil before putting on the lids and sealing them.

The Benefits of Water Bath Canning

The main reason why you should start water bath canning is the health benefits. Preserving foods can make them last a lot longer, but it can also help you protect the vitamins and nutrients that are often diminished with other preservation methods. Water bath canning is a best way to preserve those foods you love to eat all year round, and it's easy to do when you have the right equipment.

You'll preserve the most nutrients when using a water bath canner to put up your vegetables and home-canned fruit. The canning process makes the food last much longer. Many people prefer using this method because it doesn't add chemicals as other forms do, so the food doesn't lose its flavor over time.

Here are the benefits:

You'll keep the vitamins and nutrients in your food:

You'll get a lot of satisfaction from knowing that you put up your food.

Food tastes better when you use this method to preserve it.

Water Bath Canners are easy to use, making them safer for you and the people in your home.

The food lasts a lot longer. There won't be any mold or bacteria growing in the containers because they aren't sealed (you'll do this after the canning process).

- The food is more enjoyable and tastes better.
- You won't have to worry about bacteria, mold, or anything like that.
- Your food will stay safe for a much longer time.
- You can preserve your summer produce so that you can enjoy it in the wintertime.

Water bath canning is one of the best ways to preserve food, but it can be a little bit tricky at first. It's essential to keep things clean and organized throughout the entire process so that you don't end up putting your family in danger.

Water Bath Canning Advantages

You will be able to adore all the healthy food that comes out of your garden and have them last for a lot longer time than if you try other preserves.

Distribution is also easy with this method; you'll be able to share your home-canned food with everyone around you or keep it for your own family. You'll have a more enjoyable time when you water bath canning because fresh fruits are more delicious when adequately preserved and canned.

You can preserve foods in jars that have a preservation time of 8 to 12 months, depending on the thickness of your food.

Water bath canning preserves foods at their peak condition in taste, texture and nutrition.

It is a fast, easy and safe technique to do the water bath canning process without having any special techniques or equipment

Water bath canning preserves food in the freshest and best quality for several years.

It is economical as a method of food preservation, as processing is done at a fraction of the cost of freezing or refrigeration

Water bath canning does not require special tools, so there is no additional cost for that.

You can preserve a variety of foods and keep them in your pantry without having to keep track of various jars filled with different types of preserves.

Water bath canning is an easy and inexpensive way to preserve various foods to enjoy for many years.

Water bath canning preserves food in the best possible quality as it makes sure that food remains safe, tasty and nutritious.

There's no need to be worried about time and temperature while doing water bath canning as it has been proved in many studies to be the safest method amongst all other preservation methods

With water bath canning, it is straightforward to preserve your garden veggies and even fruits. It is one of the best ways of keeping food to have something to eat even when there is a lack of fresh vegetables or fruits. With water bath canning, you will be able to preserve many things for different types of dishes, such as salsa, pickles, jams and more.

The objective of Water Bath Canning

It is a safe approach to keep fresh meals fresh for a long time. Depending on the food item, it entails submerging filled food containers in the heated water for a certain amount of time. To keep food and jars from deteriorating, soak them in water. It reaches a temperature that kills any microorganisms present. The heat will force all of the air out of the Mason jar, creating a vacuum, which will seal it.

What Canning Supplies Do You Require?

You'll need to put together some equipment if you're just getting started. Ready-made preserving and canning equipment are frequently available at hardware shops or on the internet. Many of the essential pieces of equipment may already be in your kitchen; if so, you may selectively purchase the remaining items to save money in various ways. All of your decisions should be based on food safety issues. The following is a list of the essential canning and preserving equipment you'll need.

Heated water canner. A heated water bath canner is a big, deep kettle, generally made of aluminum to preserve food. They feature fitting lids and are deep enough to immerse the jars entirely, leaving at least 1 in. over their tops. The best bottoms are those that are flat. You don't need a hot water bath canner to perform this, but any stockpot will be sufficient.

Rack. A rack that goes into the canner to lift your jars above the heat source of the stockpot's bottom. Jars should not be positioned directly on the base of your canner since the heat can cause them to fracture.

Preserving jars. Preserving jars, which Mason, Ball, or Kerr commonly make, come in a variety of sizes, ranging from 4 oz. through ½ pint, ¾ quart, and quart, both in narrow-mouth and wide-mouth varieties. Those jars are used many times.

Metal bands that are clean, rust-free, and undented. Metal bands that are clean, rust-free, and undented to suit your jars. These attach to the jars' threaded rims and keep the covers in position until processing the items. Then it was sealed and chilled. If your bands aren't dented or broken, you may reuse them.

Metal canning caps for single-use. Metal canning covers that seal your jars

and are single-use. Every time you make food, you need to use brand-new lids. These lids include an interior cushion that softens during preparation (heated in the canner), allowing air to exit the jar during chilling while producing an airtight seal.

Jar lifter. Jar lifters are specialist tongs that go around the base of the canning jar rims and are used to securely grab and remove hot jars directly out of the canner following canning or to put them into a boiling water canner.

Strainer. Strainers come in various shapes and sizes and are used to mash soft, cooked foods and sieve them to extract skins and grains from the pulp.

Steel ladle. Filling canning jars using a stainless-steel ladle is common, but if you're looking for a new one, look for one with a long handle and a pouring tip or edge.

Types of Food Canning

There are main types of food canning that have been scientifically tested for preserving and canning: water bath canning, pressure canning, and atmospheric steam canning. The science behind these three methods is that they heat food already sealed in jars until the food becomes so hot that it can destroy any microorganisms that can spoil food. The heat pushes out all the air in the jar creating a vacuum seal that protects food from bacteria and other spoilage microorganisms.

Water Bath Canning

As the name suggests, a water bath canner surrounds the food jars with boiling water that fully covers the jars, transferring the heat from the boiling water to the jar and the food. Using this method, jams, jellies, pickles, acidified fruits, and jellies can all be safely canned.

Important points to not using the water bath canning method are:

Jars need to be fully submerged in the boiling water

A rack to hold the jars is necessary to allow for free circulation of water around the jars

There should be some liquid in the jars to help transfer heat easily

You can purchase a water bath canner or make one at home by using a large and deep pot that allows for a rack with jars in them, and you need a rack that you can easily get in a supermarket or order. The pot should be big enough to hold a rack and jars without water boiling over, which can be dangerous.

It's important to note that some of the new models of water bath canners are small and only designed to hold pint-sized jars that are mostly used for jams and jellies, so as you go shopping, take note of this.

Pressure Canner

A pressure canner is designed to build up pressure when heated, thus raising the temperature. This is very important when processing low acid foods such as meats and veggies that do not have an acidifying agent in their recipe. This is because low acid foods can create a good environment for botulism spores to grow when not exposed to very high temperatures. Botulism spores can survive the water boiling point.

The pressure canner is ideal for low acid foods at 10 pounds, and the pressure temperature is 240 degrees F which is sufficient to destroy the botulism spores.

There are two main types of pressure canners, and these are:

Weighted Gauge Pressure Canner

This canner has a weight that is used to control the pressure. The weight can either be a flat disk that goes up to 15 pounds or three rings of weight mounted on each other.

Once the pressure inside the canner is achieved, the weights will jiggle as a sign that the optimal temperature has been reached. This makes it very easy to monitor the canning process.

The pressure required for canning is 5 pounds; for vegetables, 10 pounds, and meats, 15 pounds.

Dial Gauge Pressure Canner

This has a dial that shows the pressure inside the canner. As the pressure and temperature increase inside the pressure canner, the dial rises. Depending on the model, the dial may indicate 1 pound or 5 pound increments. The advantage of a dial gauge pressure canner is the fact that you can adjust for

altitude.

Water Bath Canner

The water bath canner surrounds food jars with boiling water and transfers the heat from the boiling water to the food. Fruits, jams, jellies, pickled foods, and acidified tomatoes can be safely canned using a water bath canner

Equipment and Set-Up

Now that we've gotten that out of the way, we can go on to the more intriguing parts. Let's start with the tools you'll need and how to set them up properly. You probably already have a few items in your kitchen, which is wonderful since you don't always need to invest in expensive equipment and may make do with what you have. While pre-made canning kits are available for purchase, you don't need to spend since you may simply depend on items already in your house. This will undoubtedly save you money in the long term.

Simple Set-Up

You'll need a few basic things: a tall pot (the sort you'd use to boil lobster or prepare shellfish, for example) and a rack to fit inside the pot. Of course, you'll also need a whole bunch of canning jars with two-piece lids—the most popular kind is simple mason jars.

You will also require a spoon, a funnel to help with all your canning endeavors, a timer, some tongs, a clean spatula, and lots of clean towels. Although it's a less environmentally friendly way to carry out the process, you can use paper towels.

Additional Equipment

The list above is technically all you need to get started. However, other tools can help to streamline the process. These items are a lid caddy to help you keep lids organized and a magnetic lid wand, which can be a lifesaver. This handy tool helps you to remove the sterilized canning lids from the boiling water to prevent contamination, all while keeping your fingers away from hot water. This will keep you from having to suffer through a bunch of unnecessary burns when making your way quickly through the jam or jelly

canning process. Also, you may need a canning rack with handles to help make things a bit easier, and a stovetop or electric kettle will also be useful when you need to add more hot water quickly.

Starting the Process

The first thing you need to do is place the rack at the bottom of the tall pot—the rack helps keep all the jar bases at a safe distance from the bottom of the pan. Instead of burning or breaking the jars, the water can evaporate and escape around the jars, which prevents them from shaking and knocking against each other, causing them to break. Add enough water to cover the jars, at least one inch above the lids. Turn on the heat and bring the water to 140 degrees Fahrenheit. If you are hot packing, make sure the water is at least 180 degrees. Use a thermometer to get the necessary accuracy. You can begin this part of the process while the food to be canned is being prepared.

Filling the Jars



This seems to be such a simple procedure that it's almost amusing. Filling the jars with preserves, on the other hand, is a more detailed element of the work that must be done with care. First, inspect the jars and rims to make sure there are no chips or defects after they've been inside the pot. Also, make sure you're using brand-new lids that have never been used before. The rings can't be used again; they're only valid for one usage.

Some recipes call for softly heating the jars in a water bath while keeping the lids in a separate container of hot water. The ever-popular mason jars recently updated their instructions, noting that this step is no longer required when using them. However, many other manufacturers still need this first step in an old-fashioned manner, so double-check beforehand.

Before filling, all jars and lids must be cleansed with hot, soapy water, rinsed, and well dried. If this sounds too time-consuming, you might alternatively put the jars through a washing cycle. This will guarantee that they are cleansed with the hottest water possible, preserving the "bath" factor necessary for jams and jellies to be stable.

You'll need to work quickly to keep your canning jars and lids at the proper temperature following the washing. Fill the canning jars as quickly as possible, allowing enough room at the top between the food and the jar's rim. It's usually safe to go between a quarter of an inch and an inch. Make careful to double-check your recipe for specific information since this might change depending on the recipes you're using.

Topping Things Off

After you've added the mixture, scrape the inside of the jar with a clean spatula to assist release any trapped air bubbles. Then, using a clean, wet cloth, wipe any evidence of the food from the rims. The devil, as they say, is in the details, and washing away any sign of food from the rims would allow for much greater contact between the lid and the jar, resulting in a flawless seal.

The next step is to put the circular canning lids on the jars. If you can get your hands on a magnetic lid wand, you'll discover that it's a lifesaver. It enables you to rapidly and effectively grasp them one at a time. You'll want to screw them on as tightly as possible. However, make sure they aren't too tight that too much air escapes the jars since this might affect the quality of your food.

Processing the Jars

Next, you'll have to boil the jars in the same way outlined above, this time

with the jam or jelly inside. In the first step, it was done primarily to sanitize everything before adding the food. In this step, however, it's meant to further stabilize the product inside in a natural manner, without the addition of preservatives, unlike most store-bought products.

This time, you just need to load the jars onto the rack and lower it into the water bath slowly. If your rack doesn't have handles—a tool that comes in handy when adding your jars into already boiling water—then use tongs to place them. Be careful and make sure the jars are kept vertical so that the food doesn't come into contact with the rim of the jars. Again, there should be at least one inch of water above the top of the jars. If you don't have enough water, quickly boil some in a kettle and pour it into the pot. Be sure not to keep the jars too close—you will want to keep at least half an inch of space between each of them.

When you're done, turn up the heat and bring the water to a full, rolling boil, putting the lid on the pot. Start the timer according to the recipe you're following and keep a close eye on what comes next. Most canning recipes will ask that you boil a water bath for about ten minutes. Remember that the processing time doesn't begin until after the jars are fully submerged and the water has come to a full boil. If the water is boiling too much, causing the jars to shake and rattle, then reduce the heat till it boils at a gentler pace. But make sure that it is still boiling.

The Cool Down

When the processing time for your water bath canning has ended, turn off the heat, let the jars find their equilibrium, and settle for about five minutes. Set the timer again to help you keep track.

Then, remove the jars from their rack using the tongs, lifting them vertically, and be very careful not to tilt them. They're at a vulnerable stage, so be

careful with them. Otherwise, the food will touch the lid, something you do not want at this stage since you're still trying to make sure everything will be shelf-stable, with a perfect seal.

Transfer the jars to a cooling rack, or simply place many towels on the counter to protect your surfaces from the hot glass. Make sure to keep a distance of at least one inch between each jar. The towels or cooling rack is very important because you don't want the temperature of the jars to drop suddenly. The temperature shock can cause them to break. Make sure that your jars are left without anyone shaking them or moving the contents around for at least twelve to fourteen hours until they've completely cooled. Any movement at this juncture will cause the lids to flex, which can break the seal, so keep them still. Once in a while, the lid will make a small sound. This is the seal settling with the new temperature and is generally a good sign.

Chapter 2: Storage

Once you've let them cool, test the seal by gently lifting the jar by gripping the seal—you should be able to easily lift the jar from the lid. If the lid falls, then put it in the fridge and make sure to consume the food right away.

Otherwise, you'll be leaving your work out to rot. If you haven't left the jars out for too long, you can get the contents reprocessed within 24 hours.

If all goes well with the seal, wash and wipe the jars with a moist cloth and store them in a cool, dark place. They can be safe to eat for at least a year after you're done. Now your family can enjoy the fruits of your labor any time and taste the freshness of sweet strawberries even when they're not in season, or have the best kosher pickles without having to go to a deli.

Preserves made at home have a distinct flavor that cannot be replicated elsewhere. Once you've managed the canning process in water baths, you will be well on your way to having a perfect harvest all year round.

Water Bath Can The Importance of Food pH and Temperature

When it comes to canning, you need to focus on these 2 variables of temperature and pH for the quality canning process. Both of them directly affect the shelf life as high temperature, and extreme pH values kill the microbes in food. The pH is the acidity of food that decides how the food will taste.

The Effect of The Acidity on The Food

The pH is a critical parameter of the food that determines other qualities like appearance, taste, and savoriness. It has even more critical importance when it comes to canning because acidity increases the life of food. The pH factor and acidity are directly linked as the acids present in food are why hydrogen ions are in the food. They release these ions and increase the distinct sourness.

When the pH of the food is very low, the food is more acidic and sourer. The more acidic the food, the lesser chance of microbial growth. Every food has its natural acidity that predicts how the microbes can grow. The pH value should be either too high or too low to make the food unfriendly for microbes.

Usually, when the food is under processing for canning, the acids are added to make its pH low, reducing microbial life. Some foods have naturally low pH and do not require many acids. In contrast, some foods prevent the growth of microbes because of their extremely high-value pH. But both these extremes are rare cases.

So, depending on pH level, every food is passed through different processing techniques of canning. All foods fall in different pH ranges between minimum 0 to maximum 14. Let's get to know about the natural pH ranges of different foods.

The Relationship Between Temperature and pH For Canning Food

Temperature work effectively in killing microbes and destroying their spores to prevent food from rotting. But there is a strong correlation between the pH of the food and the temperature needed for processing.

The foods with high pH of more than 4.6 do not provide much resistance to the bacteria. A specific bacteria, *Clostridium botulinum*, thrives in low acids food. This low acidity calls for higher temperatures while processing the food for canning. Hence, a temperature above or near 240 F is ideal for hindering the growth of these bacteria.

In contrast, foods with low pH do not provide a chance for bacteria to grow. The spores of the bacteria remain dormant in the low pH conditions. Thus, even low temperature is enough to make the food perfect for preservation. A pH value between 4-4.3 requires a 195 F temperature for pasteurization.

All About Altitude

It is a commonly known fact that the altitude slows the cooking time because the water boils quickly. So, the food will need more time to be properly cooked. It will make sure that microbes are killed slowly. You need to increase the time by 5 minutes at each 3000 feet altitude rise from sea level.

And the same rule applies to pressure. You need to increase the pressure when cooking at a high altitude. This way, you will not have to increase timings when increasing the pressure at a high altitude.

How to choose the best jars

Wide Mouthed Jar

This jar offers more space and stuffing large-sized foods. You can store beets, whole fruits, and pickles as stuffing them is easier. Your sauces, soups, asparagus, tomatoes, and juices like grape and apple juice can be perfectly filled in a wide-mouthed jar.

Regular Mouthed Jar

A regular mouthed jar has not a wide mouth but a standard-sized mouth. You can fill things like mustard, jam, ketchup, jellies, marmalade, pie fillings, relishes, tomato-based sauce, chutneys, and fruit syrups in such kinds of jars.

In addition to shape, you should also focus on the material of the jar too. Glass is the best material when it comes to canning. That's why always opt for a glass canning jar. The size of the jar should not be too large as to waste food nor too small that you have leftovers. A moderate-sized, suitable shape according to the type of food and glass jar is the best fit.

Steps

Preparation

There are certain preparations like sterilizing the lids and jars that you need to do beforehand. But this step is unnecessary if you need to process the jar for more or less ten minutes.

After doing all the washing and sterilizing, prepare the water bath canner. It will help if you keep a stand-by kettle filled with boiling water for filling the canner quickly if needed.

The water should be brought to a boil to 140 F for raw packing. For hot packing, the boiling temperature should be 180 F.

Fill Food in The Jars

Always check the jars and lids for any imperfections like cracks. Use a perfect jar and new lids for canning with no chips or cracks. It would be best to give the jar a run in the dishwasher. Now, swiftly fill the canning jar using a ladle. When the jar is filled, stir the food using a chopstick or spatula. This step ensures that there is no air bubble trapped inside the jar.

Shut Off The Jars

All the jars have round lids specific for canning. You should place them accurately on the mouth of the jar and secure them with a lid wand. Keep screwing the bands unless the lids are airtight. Ensure that they are not too tight as the air needs to escape from the jar during processing.

Processing The Jar

Take a jar lifter and start lifting the jars one by one. You should lower each jar into the water canner. This step requires care as the position of the jar should always be vertical in the water bath. The water level should be one

inch high from the top of the jar, and jars should be half inches apart.

Now turn on the heat and let the water come to a full boil. Close the pot with a lid and let the jars process until the timer rings according to your set time.

Cooling The Jars

You should start lifting the jars from the water vertically and put them outside on the shelf. But there should always be cooling towels or a rack for putting the jar in. The jars should be at a distance of one inch from each other. Allow the jars to cool for almost 12 to 14 hours.

Store The Jars

After the jars have cooled down, check whether they are shut tightly. Press down your finger on the lid to check the seal of the jar. If they are not sealed properly, the jars will wiggle.

Now you should start removing the rings from the jars. If you can lift the jar from the lid, there is no need to worry about proper sealing. Now wipe the jars with a clean moist cloth. You should store the jars in a dark and cool place.

Chapter 3: Steps for Water Bath Canning

The water bath canning process is suitable for high-acid foodstuffs. It involves dipping your jars into a vessel of boiling water. For this, you can use a large pot you have at home or acquire a boiling water canner if you are serious about this craft.

The boiling water canner needs to be deep enough to allow one inch of space above the top of the jars during the boiling process. Some models do not have completely flat bottoms, so these might not work well on smooth-top ranges. You want the canner bottom to be fairly flat so that you can use it with electric burners. If you have a gas burner, you can get a canner with a flat or ridged bottom.

For uniform processing for all jars simultaneously, the canner should not be more than 4 inches wider in diameters than the stovetop or any element that heats it. That means, when you slap your boiling water canner on top of a burner or stove, the canner should not extend over the edge of the burner or stove by more than two inches on any side. If you have a smooth top range, check with the manufacturer on canning suitability and the recommended canner size.

Processing Steps

It should go without saying, but you should read through all these instructions first before attempting to do this.

Before preparing your food for the canning process, put the canner rack in the boiling water canner and fill it halfway with clean and warm water for a canner load of pint jars. If you want to work with other sizes and numbers of jars, you need to add more water. The rule of thumb is to have one to two inches of extra water above the top of the jars once they are fully submerged.

With the canner or pot, center it over the burner and preheat the water to 140 degrees F if you want to preserve raw-packed foods. If you work with hot-packed foods, go for 180 degrees F. While the water is heating up, you can prepare food for your jars.

With a funnel, load up your jars and fit them with lids and ring bands. Put them into the canner one by one using a jar lifter. When you move the jars around with a jar lifter, ensure that the lifter itself is positioned securely below the neck, specifically below the ring band of the lid. Make sure that the jar is upright at all times. Even slight tilts could cause the food to spill into the sealing area of the lid, compromising the overall seal.

Now, if you have a shaped wire rack with handles to support it on the canner sides, above the water, you can put the jars onto the rack in the elevated position and then drop the rack with jars into the water using the handles.

Now that the jars are dipped in the water add more boiling water as needed? Again, you want the water level to be at least an inch or two higher than the top of the jars. When adding water, make sure that you are not pouring boiling water directly on top of the jars. Pour around them. If you need to process the jars for over half an hour, the water level should be two inches above the top of the jars.

With everything set, turn the heat to the max and cover up the canner with its lid. Heat it until the water boils vigorously. When the water is boiling, start the timer based on the recipe you are following.

It's worth pointing out here that the timer indicated in the recipe only counts from the moment when the water is boiling. If it takes five minutes to bring the water to a boil and the recipe calls for 60 minutes of processing time, then you let the jars stay in boiling water for 60 minutes, not 55.

During the entirety of the processing time, make sure to keep the canner covered. You can turn down the heat a bit if you want, as long as you can maintain a gentle but complete boil at all times.

As you might have guessed, water would evaporate during the process, so you need to keep checking up on the water level now and again to ensure sufficient water to boil the jars and their contents. If the water level drops below one inch (or two, if the processing time is over 30 minutes), add more boiling water. Not just any cold water. You want the new water to already be boiling by the time you add it in. Add as much as needed. Again, do not pour it directly on top of the jars.

Sometimes, the water may stop boiling, especially if you decide to turn down the heat a bit. If that happens, turn on the heat to max and bring the water to a vigorous boil again, and start the timer from the start.

After processing the jars in boiling for the recommended time, you can turn off the heat and remove the lid off the canner. You want to let the content of the jars settle down after that boil, so let it sit there for about five minutes before you take out the jars to ensure that the content is safe to eat. However, you do not need to follow this waiting period following USDA or University of Georgia processing times.

Fetch your jar lifter and take out the jars one at a time. Again, do not tile the jars. Put them on a towel or a cake cooling rack to let them cool off completely. If you handle multiple jars, make sure that there is at least one inch of space between each of them.

Let the jars sit there and cool off naturally for 12 to 24 hours. Do not place your jars on a cold surface or in a cold draft. You want them to cool down naturally to room temperature. Do not disturb them during this time. That means do not tighten the ring bands on the lids or push down on the center of

the flat metal lid. Leave them for now.

After the waiting period is over, you can now inspect the jars. Start by removing the ring bands from sealed jars. Any unsealed jars have to go into the fridge and their contents consumed first.

Make sure to clean your jars and lids to remove all residues. You can then label their contents, date them, and put them in a cool, dark, and dry place.

Most Common water bath Canning Problems

The most typical difficulties you'll encounter during water bath canning, as well as how to remedy them, are listed below.

Canning Jars Sealing

Jars that don't seal are one of the most typical canning issues. Food residue, nicks in the jar rim, overflowing jars, and other factors might cause the lids to fail to seal correctly. If you discover soon that the jars did not seal properly, the food will not lose forever. If it's been more than 24 hours, the food must be discarded owing to the danger of spoiling and microbial development.

Prevent Jars From Not Sealing

Before filling the jars, please give them a thorough inspection. Examine the jars for any fractures or nicks that could cause them to shatter or prevent the lids from closing correctly.

Check the recipe for the proper amount of room in between the lid and the meal. A measurer is included in the canning package to determine the proper headspace.

After you've finished filling the jar, wipe off the rim with a clean towel.

Don't tighten the rims too much. Screw them on until they're fingertip tight.

Make sure you're using a fresh lid each time. Canning lids are not reusable.

Runny Jams or Jelly

Jams and jellies that are runny are frequently the results of improper cooking. It's might possible that you didn't use enough pectin or sugar. To help set the jam, boil the jams and jellies for a certain amount of time after adding the pectin and sugar.

How to Fix Runny Jam and Jelly

Do you already have jars of runny jam on hand? Don't worry; you'll be able to repair it! Allow for a 24-hour period for the jam to form. It might take a long time for pectin to set. If it still hasn't been set, you'll need to calculate how much jam you'll need to reheat. Remaking more than 8 C. at a time is not recommended.

14 C. sugar and one tbsp. powdered pectin equal 4 C. jam.

Add the sugar and pectin mixture to the jam in a low, wide pan. Stir until all of the ingredients have dissolved.

Bring the jam to a boil, then simmer for 5–10 minutes, stirring occasionally.

Make sure it's set better this time by doing the plate test.

Fill clean jars with the jam and process in the same manner as previously.

Liquid Come Out During Processing

It's not an indication of spoiling if you lose fluid during processing, and you don't need to open your jars to replenish the liquids. If your jars have lost half of their fluid, you should refrigerate them and utilize the contents within 2–3 days. This typical canning difficulty is caused by several factors, including, after the processing phase, the pressure within the canner drops dramatically. Inside the jars, you left air bubbles. Changing pressure within the pressure canner during processing. You didn't tighten the ring bands sufficiently. In the boiling water bath canner, you didn't completely cover the jar with water. An insufficient seal. You crammed the food into the jars too tightly, causing it to boil over during processing.

Fixing of Liquid Loss During Canning

Analyze what caused your issue this time since a variety of factors might cause liquid loss. Then, to prevent it from occurring again, follow these guidelines.

Remove any air bubbles from the food contents using a plastic knife or spatula before putting the lids on the jar.

For whatever you're canning, figure out how much headspace you'll need. Stick to the recipe! Then, using your fingers, tighten the rings on the jar. Make sure they're not too tight.

Allow your pressure canner's pressure to naturally decrease, then wait 10 minutes before opening it when the weight is removed from the lid.

Maintain a steady temperature throughout the procedure. That means you'll have to pay close attention while it's processing.

Ensure the jars are covered with 1–2 in. of water if using a water bath canner.

Food Darken at the Top of the Jar

You may notice that the food near the top of the jar appears darker at times. That does not imply that the food has gone wrong. Although darkened food is undesirable to look at, it is not harmful to eat. Air is the most common cause of darkened food. There is a possibility that there was too much air in the jar, causing oxidation. If you don't use as many liquids or syrup, you'll end up with too much air. Another reason for food darkening is that you didn't process it long enough to kill the enzymes.

How to Prevent Darkening Food

Preventing darkening food in the jars is one of the most accessible can problems to fix. Here's what you need to do. Check the recommended

processing time for the recipe that you're using because you need to know it. Water or syrup should completely cover anything you're canning. Before closing the jars, be sure to remove any air bubbles and utilize the required headspace depending on the recipe.

Floating Fluid

Do you have any jars with floating fruits in them? Fruits and tomatoes that have been over-processed might lose their natural pectin. Fruit may also float if the fruit is lighter weight than the sugar syrups or if it has been inappropriately packed.

What to Do If Your Fruit Is Floating

It's a simple repair if you detect floating fruit. The essential thing is to follow the instructions for processing periods to prevent over-processing the delicate fruits. Also, make sure the fruit is firm and ripe. Before packaging the fruit, warm it up. Fruits, unlike vegetables, should not be packed uncooked. Use a light or medium syrup, and compress the fruit carefully to prevent crushing it.

Practice Makes Perfect

Canning, like gardening, is a skill that takes time to master. Making errors is an integral part of learning a new skill, so don't give up if you commit one of the most frequent canning blunders. Learn how to correct and avoid these blunders so that your canned foods endure for years in your cupboard.

Water bath Canners

The water bath canner is a very large pot that normally has capacity size of 20 (or larger) quarts. It comes with a lid that seals tight in order to keep the pressure and the temperature high within the can. This canner also comes equipped with a wooden or wire rack.

The purpose of the rack is to keep the boiling water equally distributed around the jars in order to make sure that all of the jars get processed. The rack allows for the jars to have their own space within the pot, meaning you don't have to worry about your jars touching each other which could lead to breakage within the pot.

Don't Want to Buy a Water Canner

Now let's say that you are not interested into buying a fancy water canner or you already have a pretty large pot, than instead of buying a water canner you can save yourself some money and just use what you have, or just buy a large pot.

In order to skip buying a water canner you will need any type of large metal pot that will be deep enough to put jars into the pan while also allowing there to be at least an inch of boiling water over the top of it. Now there is such thing of having a pot that is too large. The standard pot for canning should not be four inches wider than your stove burner. If your pot is too large than certain jars will not get process as equally as the others.

Next step is replacing the rack; you still need something to acts as a buffer to keep the jars from bumping into each other and cracking inside the pot. You can use a clean dish towel to wrap and the jars or you could also place rings inside of the pot to hold the jars in place.

Pressure Canners

For review purpose you only use the pressure canning Direction for low acid foods such as your meats, poultry, fish, and vegetables.*

A pressure canner is a large pot but the difference between this canner and the water canner is that the pressure canner is a stainless steel heavy duty pot that is made strong enough to endure extreme steam and pressure. The lid of this canner comes with a vent and also a rubber seal to stop any air from seeping into the can and disrupting the process. A rack is also included with the pressure canner and serves the same purpose as the rack in the water canner.

A pressure canner is a large pot that is filled with just a few inches of water. Jars of food are added to the pot and the lid is closed and sealed. Steam builds up inside the pressure canner and processes the jars at temperatures up to 240°. The jars are cooked for a long amount of time, typically over an hour, to ensure all bacteria are adequately destroyed. This method is perfect for low acid foods where bacteria are more likely to grow. By placing the jars in such a high temperature environment, bacteria will die and make your canned food safe.

One more thing to make note of is that there are two types of pressure canners. There is one pressure that comes with a dial and there is another that comes with a weighted a gauge. In my opinion one is not better than the other and they both provide the same end result.

Jars

There are three parts to a jar; the metal screw band, metal lid, and the jar. The jar is where you will put the food that you want to process. Some of the types of jars that can be used to canned food items include Mason jar and

Ball jars. You could also use any type of jar that is threaded and comes with a self-sealing lids. Also, these jars have to have a wide opening approximately about three inches, so that you are able easily empty and fill it.

Jars can come in many sizes ranging from 1/2 a pint all the way up to 1/2 gallon. The can be reused numerous times until they wear out. You will know that a jar is worn out if it has any type of chip or fraction within the glass. If the jar is even slightly chipped than it will disrupt the seal and possibly break in the canner while you are in the process of canning your food.

Jar Lids

The lid is one of the most important parts when it comes to sealing the jar and keeping out the air. The jars that are sold in today's market come with a two piece lid that has a selfsealing compound that is basically a metal disc and a ring.

Since the lid is small and thin and is easily softened when it is heated, it is a must that you dispose of the lid once you are done using it. But you metal screw bands/rings can be reuse numerous times because it's only job is to hold the lid in place while it's being processed.

Preparing the Jars for Canning

It is necessary that you always use a clean sterilized jar before you begin the process of canning. When you clean a jar you ensure that the food that is being canned will have a long shelflife, while also removing and destroying any bacteria, yeast, or fungi that might be in the glass jar. The Direction of sterilizing the jars is quick and easy should never be skipped over.

Jar Cleaning and Preparation

The first thing you want to do to the jar glass, which is not heated, is simply wash it with dish detergent using hot water. You have the options of either washing it by hand or using the dishwasher, either or works just fine. You want to make sure that you rinse out the dish detergent thoroughly, because any leftover residue might cause your food items to turn a different color or might affect the taste of it. Let it be noted that this is a preheating Direction to sterilizing the jars, and does not actually sterilize the glass jars.

Sterilizing the Empty Glass Jars

The sterilizing procedure takes around thirty minutes and difficulty level is easy. There are three Directions that you can use to sterilize your jars, and each Direction will be discussed in the upcoming sections. This is a necessary part of the canning and it should not be skipped.

The Oven

The oven sterilizing Direction is probably the most used technique. Wrap the two shelves in your oven with two layers of newspaper. Make sure there is enough room for the jars around the head space level, so that glass jar is not touching the top of the oven and the same goes for the bottom part of the oven.

Heat the oven to a maximum heat level to 275 degrees. If you try to make the oven any hotter than the suggest temperature, you will risk the jars breaking in the oven. Put the clean glass jars inside the oven on the shelves. Make sure that the jars have their own space and are not touching each other.

Leave the jars in the oven for twenty to thirty minutes. To remove the jars from the oven you want use very thick oven mitts and take the jars out and place them on a cutting board.

Dishwater Direction

You can use this technique only if you have dishwater that has the capabilities of reaching a high temperature. Place the clean jars inside of the dishwasher giving enough adequate space where the glasses are not touching each other.

You want to run the dishwasher for as long as it takes you to get your food ready. For instance if you are canning green beans then you want to boil the green beans at a high temperature (hot packing), and until your green beans are done you don't want to take the jars out the dishwater , because your jars will cool down before you get the chance of filling it with the prepped green beans.

Microwave Direction

I know that I stated never to use the microwave in the actual canning process but you can use it to sterilize a jar. This technique is best used if you are only preparing one jar and need a quick way to sterilize your jar. To use this Direction you want to put the clean jars in the microwave, but you want the jars to be a little wet.

Microwave the jars on a high setting for 3045 seconds. I would only use this Direction for one jar because you want to make sure that the heat is distributed equally. Another key note is to make sure that your timing is together with whatever food you plan on canning, especially if you are hot packing.

Sterilization Reminders and Other Mentions

Try to go beyond and above when you are sterilizing the jars, such as repeating the preheat cleaning Direction several times before you actually begin to sterilize the jars with heat.

Time your sterilization with the food that you plan on canning to make sure that jars don't get to cool.

Never add hot food to a cool jar, because the glass jar will break. And viceversa don't add cold food to hot jars

Jar Packing

It would be a great ideal and a help to you to go into detail about how to pack a jar when you get finish cleaning and sterilizing and your food once it is ready to be put inside the jar.

Raw packing

When raw packing a food item with boiling hot water, or if it is a fruit item you would want to cover it in a hot sugar syrup or juice. As I stated in the jar sterilizing reminder section you do not want to put cold food into a hot jar. Another step in raw packing is making sure that you leave enough head space between the food and the top of the can. This space will allow bubbling and prevents the overflow of the food items out of the can while you are doing the canning process. Most recipes calls for different measurements of headspace and is normally around 1/8 1/2 inch.

Hot Packing

To do hot packing you want to heat your food item in the boiling hot water before you put it into the jar, and then you want to put it in the sterilized jar. And you also want to make sure leave the appropriate headspace the recipe calls for.

Water Bath Canning vs Pressure Canning

Water bath canning and pressure canning are both USDA approved methods of preserving foods. Both are safe and can easily be done right from your own kitchen. However, the two methods are quite different and should be used to process different foods. Take a look at each and then learn about when you should use a water bath canner and when you should take out your big pressure canner.

Canning Tomatoes

Tomatoes used to be completely safe to can using solely a water bath canner, but the acidity of tomatoes has changed over the years. They are much less acidic than they used to be, placing them on the cusp of being a low acid food. However, as long as tomatoes are processed with lemon juice, vinegar or added citric acid, they are still considered safe to can in a water bath canner. Be sure to follow any tomato recipes exactly if you plan on using a water bath canner in order to use the proper acid levels.

What Should Not Be Canned

There are very few foods that you cannot can safely from your home. First, dense foods, like mashed potatoes, are not recommended for home canning. This is because the heat cannot penetrate through the center of the food, putting it at risk for microorganism growth. You can, however, preserve potatoes and dense foods if they are cubed and covered in water.

Milk and milk-based creams are also not recommended for canning. There has not been enough research yet to support home canning of milk products. If you see milks in the store in cans, they will almost always be in aluminum cans which can be heated to a temperature of 275° F, much higher than you could reach at home. Commercial canneries will also drastically reduce the temperature of the milk after it is processed, dropping it rapidly in order to prevent pathogenic organism growth. This is another thing that is not achievable in a home kitchen. All in all, avoid canning any milks, creams or recipes that have these ingredients in them.

Delicate berries, such as raspberries or strawberries, are difficult to pressure can when whole. The fruit will turn brown and mushy when exposed to such high temperatures. The berries would still be edible, but it would take away from their appeal. It is better to simply turn soft berries into jams or jellies to be canned.

Canning in Season

Whether you are using a water bath canner or a pressure canner, it is always a great idea to can fruits and vegetables that are in season. When foods are in season, it means they are at their peak readiness, tasting the best and grown naturally. Foods also often cost less when they are in season as there is less effort needed to grow it (it is much easier to grow apples naturally in the fall than in the spring!). In addition, foods will be easier to find locally when in season. Check out the seasons for each food and think about canning them during their proper season.

Canning Fats

You may find that some sources out there do not recommend canning foods that are high in fat or adding fat to a food. This may make you wonder how you are going to can a nicely marbled beef or preserve roasted peppers in olive oil. Don't worry. You can preserve fatty foods from home; you just need to take a few extra precautions.

The reason why fats can be tricky to can is that the grease can prevent the jar lid from sealing properly. This can easily be remedied by cleaning the rim of the jar thoroughly and giving ample headspace to fatty foods. Wipe the rim of the jar with a clean towel dipped in vinegar before placing the sterilized lid on top. Give about 1 ¼ inch of headspace to any foods that are high in fat, so the contents do not come close to the lid when canning. These two simple steps will help the jar seal well despite having a fatty food inside.

Conclusion

Water bath canning nowadays is used primarily for home canning to preserve food's flavor and nutritional value. It is a very safe way to preserve food because it does not use any chemicals. The only things that are in the jars are the acid and other preservatives if you choose. This method produces good results in preserving food from bacteria because the jars are boiled whole, killing all harmful germs and microorganisms that cause spoiling or decay. The steps use steam under pressure to cook food that is placed into a sealed jar. The jars are then placed into boiling water for a specified time to sterilize and seal the jars.

Water bath canning is a technique that requires you to use water to sterilize jars and covers during the sealing process.

Besides the reasons you want to preserve food, many people do not know about more specific and less known benefits. This will briefly outline and discuss these 'secret benefits' that are largely unknown even throughout the food preservation world. Everything knows that canning and preserving foods are used for protecting large quantities of food products over time. Some methods that have been used for millennia, such as drying, to methods such as canning that are more recent and contemporary.

The reality is that having a stock of healthy, quality foods for a long period, you have a pillow against any economic downturns that could lead to food shortages, something that many people don't know about or even think about when they decide they want to preserve foods. Being safe is always a good thing. You will be able to take advantage of fresh food when it is abundant and affordable.

BOOK 5: FERMENTING AND PICKLING FOR PREPPERS

Introduction

Fermenting foods has been around for centuries but it's just gaining traction in the health and wellness world mainstream. It isn't a fad by a long shot and it's definitely something you'll want to add into your diet for a healthier body and gut. Learn about why and how fermented foods are good for you as well as some of the easier recipes to get you started and on your way. Fermented foods aren't only great for you, they're delicious.

It is unknown to many that the main underlying cause of most autoimmune diseases is poor gut health. Scientists discovered, through recent studies, that one of the things that have a direct impact on our immune system and mental health are the things that get absorbed by our gastrointestinal tract--our digestive system.

Therefore, it is important that we learn how to keep our mind and body healthy through the food that we eat. Making fermented food a staple of our daily diet is one way to achieve this. And this is what this book will help you learn.

Pickling is a culinary art that people of different cultures practice all over the globe. To give you an idea what pickled foods look like, examples include, kosher cucumber pickles, salsas, pickled herring, chutneys, kimchi, miso pickles, and others. These examples are found in different countries, and that goes to underline the fact that pickling is a global practice. The big question, really, is what you do in order to be able to say you have pickled your food.

To make pickles or to pickle your food, what you do is to dip it in a solution that ensures the food has a long shelf life. Salting food is another complementary way of ensuring your food can last long without getting spoilt.

In ancient times, nomadic tribes of Africa and elsewhere would salt their meat to ensure it lasts many days and sometimes weeks. In fact, people of different cultures would preserve their food supplies for use during the winter season or during famine, and for that lengthy preservation they would do salting and pickling.

Sometimes people use vinegar for pickling, and this is because vinegar is acidic enough to kill bacteria that would otherwise cause food to go bad. Other foods are pickled in salt brine, and that is because it is a liquid that enhances fermentation. The reason fermentation is encouraged here is that good bacteria ends up developing, and that makes the food much less vulnerable to the bad bacteria. And, of course, if the growth of bad bacteria is restricted, it means your food cannot get spoilt quickly.

Chapter 1: Understanding Fermenting

First, let's familiarize you with what fermenting foods means and why it is used. We will start by giving both the historical and the cultural background to fermenting foods. You will also learn how beneficial gut bacteria can be for your health. This section discusses the three fermentation types: lactic acid fermentation, acetic acid fermentation, and alcoholic fermentation.

Fermentation is a fascinating process, and this book is all about it. Also known as culturing, the basic and most important aspect of fermentation is a microbe. These microbes are tiny organisms present all around us, including your body, soil, and home. Many people think bacteria of all types are harmful to us and cause diseases. However, some microbes are actually beneficial for the body and even protect you against various illnesses. The important thing is to have a good balance of microbes in your body.

History of Fermentation

Fermentation has been around as long as man. Its exact origins have not been determined yet, but evidence shows fermentation being used as far back as 7000 BC. In Chinese history, there is evidence they used fermentation to create rice wine around 4000 BC. The word itself comes from "fervere," a Latin word meaning "to boil." It probably referred to the conversion of fruit juice to wine after yeast was introduced to it.

Initially, our ancestors depended on fermentation for survival. They did not have easy access to food, and they needed to find ways to preserve it. They also had to prepare their rations so they could survive from one season to another.

Preserved food was especially important during winters when they couldn't grow or hunt for food as easily. They needed an option for when the harvest season had passed or when they couldn't hunt. These needs were how grapes were turned into wine and milk was made into cheese. Most countries in the world have their own traditions of fermenting food.

Egyptians made beer and bread with controlled yeast. Fruit juices were fermented to make tonics, wines, and cordials. The Romans made garum by fermenting fish guts. The Norwegians discovered the salted salmon buried and left for a while tasted different from fresh salmon but was still edible and delicious. In Russia, they left vegetable scraps in a barrel to age in winter, and this was how the original borscht was prepared. In Korea, cabbage was buried to last through the winter, resulting in the discovery of kimchi.

The western equivalent of this was sauerkraut in Europe. As our ancestors adapted to their environment and made new discoveries, they provided us with many different food options. The techniques and tools have been refined

over the years, and we have better control over the process. The basics of the traditional methods lie at the core of preparing good, fermented foods. You can use accurate tools and techniques to get the desired results, but you also need to depend on your senses of taste and smell when it comes to fermentation.

In every culture, you can see traces of fermentation being passed over for generations. Humans have been using natural microbes for their health benefits for a long time. The beginnings of fermentation are unknown, but it is believed it might have started on accident. Someone might have dropped wild yeast or microbes in some grape juice, grain, or other food. This would have allowed for the fermentation process to spontaneously occur if the surrounding temperature was right. Ideally, temperatures between 40 and 70 °F can easily support fermentation.

The benefits of fermented foods have led people to embrace the process for a long time. In the next chapter, you will learn more about why fermentation is important and how it is beneficial. Many different techniques vary from culture to culture.

For instance, dairy farmers used fermentation to store milk for longer by turning it into cheese. Cheese is one of the earliest and most basic fermented products we know of. The core ingredients used for fermentation vary according to what was available in certain places. It could simply be dependent on what local microbes liked to consume.

The fermentation of certain foods is usually referred to as culture. This is because cultures or communities of microbes colonize a food. These microbes use the naturally occurring sugars in food for energy and simultaneously cause the fermentation process in food. This process takes place without the presence of oxygen and is thus called anaerobic digestion.

It results in the creation of products like kombucha, cheese, sauerkraut, etc.

Wine, leavened bread, and beer are some of the earliest fermented foods. East Asian fermented foods like kimchi, pickles, vinegar, yogurt, etc., soon followed. In recent times, fermentation is also used for making vitamins B-12 and B-2, antibiotics, gluconic acid, and citric acid. Modern industrial fermentations also create microalgae and nutritional yeast.

In ancient times, the process of fermentation was somewhat of a marvel and mystery to humans. They did not really understand what caused or allowed fermentation to occur, and some even attributed it to the work of divine forces. In Japan, early breweries often had a small shrine where daily prayers were offered. In Greek mythology, Bacchus was proclaimed the god of wine.

One of the most significant contributors to the science of fermentation was Louis Pasteur. He was a French chemist and physicist who made discoveries that left a lasting impact on science, including the subject of fermentation. His germ theory, the Pasteurization method, and the creation of vaccines are some of the most significant contributions to science.

Around 1856, he connected fermentation to yeast, which made him the first zymologist in the world. An accident took place in a sugar beetroot distillery, and he was asked to investigate it. He discovered the spoiled batch had high levels of lactic acid instead of alcohol, which was why it tasted sour. The sour batch had a large amount of lactic acid bacteria, and this observation played a fundamental role in what we now know about the role of bacteria and fungi in fermentation. His observations allowed him to understand that the process took place in an anaerobic environment.

Later, Eduard Buechner discovered that fermentation could also occur with cell-free yeast extracts driven only by their enzymes. Fermented foods were considered a health benefit only around 1910. At this point, Elie Metchnikoff,

a Russian bacteriologist, determined that Bulgarians have a longer lifespan than others because their diet had a larger amount of fermented milk. Over the last few decades, more research has been conducted to study and understand fermentation. This research has shown a clear link between improved digestion and friendly bacteria. Therefore, probiotics became a widely recommended part of the diet.

What Is Fermentation?

It is a process where organic substances are chemically transformed into simpler compounds due to the action of enzymes produced by bacteria, yeast, and other microorganisms. The enzymes break down complex organic molecules into smaller compounds and nutrients. In the case of food, fermentation makes the end product more digestible for humans and creates distinct texture, aroma, and flavor, which improve the initial product. Fermentation processes are usually activated by yeasts, molds, or bacteria, either in groups or singularly.

All microorganisms have their own unique metabolic genes, and these produce enzymes that will break down specific types of sugar metabolites. In the process of fermentation, different kinds of microbes are present in various proportions. They work together to give you your desired fermented byproduct. The taste of certain fermented foods will vary depending on the numbers and types of microbes used in the process.

All You Need to Know Before Starting Pickling

Pickling has been practiced for approximately 4,000 years. Pickles were said to be a part of Cleopatra's beauty formula. Pickles were even given to Julius Caesar's soldiers as a source of strength. Pickles have become an integral part of the American identity, with the typical person eating 9 pounds of pickles every year! While there is no strong science to back either Cleopatra's or Napoleon's assertions, pickled foods have been demonstrated to be a healthful, cost-effective, and delightful method to enjoy the taste of fresh food all year.

Pickling, Exactly What Is It?

Pickling is the preservation of food through anaerobic fermentation in brine or vinegar, which can keep perishable items for months. Pickling is most commonly achieved by preserving produce in a vinegar-brine, most commonly using the water bath canning method, or by wild fermentation, which requires fermentation equipment such as a pickling crock or a fermentation kit, such as the Perfect Pickler.

While starting the pickling process at home can be frightening for beginners, with a few simple supplies and tools, we can all be quick-pickling like pros in no time.

Different Types of Pickling

Quick-pickling, salt-brine pickling, and the vinegar brine soak-and-rinse method are the three primary ways for vinegar brine pickling. There are various variants, recipes, and ways to make relishes and chutneys within those procedures. Each pickling method has its own set of advantages, and some foods are better suited to one method than another.

Quick Pickling

While longer-term, shelf-stable pickling necessitates specialized fermentation equipment (such as a pickle crock), the rapid pickling method—ideal for beginners—requires only a pot, a heat source, and a few airtight jars. This approach is not only a simple way to get started with pickling, but it's also a cost-effective and tasty way to preserve your favorite veggies and fruits.

Quick pickles are also referred to as "fresh pickles." The fundamental approach is to pack your fresh vegetables and any extra spices into sterilized canning jars, fill the jars with a vinegar-based pickling brine to completely submerge the fruit, and then use the water bath canning to preserve the jars. Asparagus, for example, are blanched before being pickled. Other vegetables, such as beets, are boiled until soft and then cooled before being pickled. Cucumbers, carrots, cauliflower, peppers, and green beans are all excellent pickled choices. Cherries and apples are other great choices.

Quick-pickles are the most convenient way to enjoy tasty pickles in a few days or fewer. They may lack the depth of taste of fermented pickles and may not be as healthful, but they are the ideal way for first-time and beginner picklers.

Salt-Brined Pickling

The salt-brined pickling method is designed for pickling high-water-content

vegetables and produce. You can pull some of the natural water content out of the produce by salting it before packing it into the canning jars. This allows the pickling liquid to penetrate the produce more deeply, improving flavor, texture, and shelf life.

This approach involves sprinkling salt on your produce or soaking it in a salt and vinegar brine solution to remove the water. You'll want to properly rinse and drain your vegetables after they've been adequately salt-brined.

After the product has been rinsed and drained, proceed with the 'quick-pickling' procedure mentioned above. Basically, you place your veggies and any additional spices into canning jars, pour a vinegar-brine pickling solution over them, and then use the water bath canning procedure to preserve the canning jars' texture and shelf life.

Bread-and-butter pickles, kosher-style dill pickles, cabbage, zucchini, eggplant, and other high-water-content vegetables are often pickled using the salt-brined process, and they make for tasty everyday snacks! Salt-brined pickles are the ideal way to make classic-tasting pickles with the taste, crunch, and shelf-life you'd expect from store-bought varieties. This technique is ideal for intermediate picklers.

Soak and Rinse with Vinegar-Brine Pickling

This approach is similar to the salt-brined method above, but it adds a layer of complexity to get the most water out of the produce. This allows the pickling liquid to completely soak the fruit, resulting in a more delicious and well-textured pickle. By soaking, draining, and soaking again with a vinegar solution, this procedure extracts the maximum amount of water from the crop. A salt-water brine and a lot of sugar are sometimes utilized in this technique.

The vinegar-brined method is commonly used in recipes such as 9-day and 12-day pickles, as well as Sweet Gherkins. This procedure is also used to pickle watermelon rind and other soft fruits, albeit there are fewer steps for these fruits than for vegetables. The most conventional of picklers will like vinegar-brined pickles, which have a distinct crunch, texture, and flavor.

Fermentation Pickling

Fermentation pickling is a whole different technique from the vinegar-brine procedures we've examined thus far. To prepare fermented pickles, immerse your food thoroughly in salt-water brine, usually in a pickling crock or a fermentation kit like the Perfect Pickler. Pickling weights keep your produce submerged at all times, ensuring that it never comes into contact with oxygen or bacteria found in the open air. The vegetables are then buried in the brine and left to ferment for a few days or weeks. Fermentation times differ based on the recipe, the environment, and personal preference.

The salt takes the natural water out of the product as it is fermenting. The carbohydrates are digested by naturally occurring microbes, which produce lactic acid and other helpful bacteria. This technique lowers the pH of the liquid to a level that preserves the product while keeping it safe to eat. To aid the fermenting process, you don't need to add vinegar, sugar, or citrus.

Fermented pickles have a distinct flavor and scent that cannot be replicated using the vinegar-brine procedures described above. Fermented pickles are also the healthiest sort of pickled food because they contain living bacteria and probiotics that are created during the fermenting process.

Sauerkraut is undoubtedly the most well-known fermented pickle recipe, with deli-style dills and barrel-aged pickles coming in second and third, respectively. Pickles that have been fermented are actually quite simple to create. If you have a pickling crock (also known as a fermentation crock),

you may use it to make everything from sauerkraut to dill pickles to kimchi and more.

As a budding homesteader, getting into the world of fermentation can be one of the most thrilling things you'll ever accomplish, providing your family with both delicious and nutritious snacks all year!

Pickling Relishes and Chutneys

Pickling your own food at home can be done in a variety of ways. Making relishes, chutneys, and other pickled foods is one of our favorite ways to impress friends and family. Relishes and chutneys are pickled foods made out of finely diced pieces that commonly incorporate a variety of fruits and vegetables for a unique flavor and texture.

Many relish recipes use a salt-brine or vinegar brine to pull the water out of the vegetables before pickling, resulting in a more flavorful result. Although many chutneys are cooked ahead of time to achieve a jam-like consistency, they nevertheless use the same basic ingredients and processes as relishes or other pickle recipes.

These relishes, chutneys, and other unique pickling dishes make excellent gifts or appetizers while entertaining guests. They'll also bring a new dimension of taste and excitement to daily recipes.

Vinegar

Pickled foods may be canned and kept on the shelf or in the fridge right away. This technique is also known as “quick-process.” or “fresh-pack”. Because vinegar is acidic, it keeps the food from spoiling. As far as the acidity level is less than 5%, you may use apple cider vinegar or white vinegar.

This is the technique used to make most professionally produced pickles, and

it is the method that most people identify with pickling in contemporary times. Since vinegar-brined pickles are not fermented, they are sometimes known as “fresh pickles.” However, vinegar-brined pickle preparations typically include some salt. You can brine the fruit or veggies in salt, vinegar & water to create pickles using vinegar brine. Glass jars may be used to make these pickles; they can be recycled glass jars or a new set of jars. A home canning method, such as water-bath canning, is used to secure the jars.

The Pickler's Kitchen

When it comes to pickling and fermentation equipment, you have a lot of things to put together. It all comes down to the types of pickles you want to make. This guide was created to help you select the best, highest-quality pickling equipment for your needs. Here is what you will need:

Crocks and jars

Canning pots, canners, and more

Jars, lids, kits, and jar lifters

Pickling ingredients, salts, and other ingredients like given below

The Tools Pickle Crocks:

These crocks are simply jars (typically porcelain glass or stoneware) used to contain pickling or fermenting vegetables and fruits etc. Most people aren't aware that they serve an essential culinary purpose. You've probably seen them at antique stores or in other areas of farmhouse decor, but most people aren't aware that they serve an important culinary purpose.

Air-tight jars

Choose a container that is fully airtight to preserve your pickles fresh, and your fridge from smelling like vinegar. Ball quart jars are a fantastic place to start because they're classic and economical. The jars you can use for pickling include:

Mason jar

Wide mouth half gallon jar

Regular mouth Pint jar

12-ounce jelly jar

Commercial jar

Vinegar

While the type of vinegar you use in pickling depends on your own taste preferences, apple cider vinegar, distilled white vinegar, white wine vinegar, and rice wine vinegar are all regularly-used vinegars.

Salt

In the pickling process, you should avoid using table salt or any salt that has additives. It's best to use pure sea salt or salt made specifically for canning or pickling.

Sugar

While white sugar is commonly used in pickling, try replacing it with brown sugar, honey, or agave for a different flavor profile.

Water

Although any type of water can be used in this procedure, filtered water is ideal because hard water can cause vegetables to discolor over time.

Spices and Herbs

When it comes to spices, herbs, and other flavorings for homemade pickles, the possibilities are unlimited, allowing for endless creativity and personalization. Coriander seeds, whole peppercorns, bay leaves, mustard seeds, allspice, red pepper flakes, dill, and chilies are among the most common pickled spices and herbs. Those who like their pickles spicy will appreciate the inclusion of garlic cloves and jalapenos.

Produce

Similarly, the options for the show's star, the produce, are limitless. Pickling

possibilities include tomatoes, peppers, green beans, beets, onions, carrots, cauliflower, squash, mushrooms, radishes, asparagus, and jalapenos, as well as fruits like watermelon, peaches, strawberries, and cherries.

Chapter 2: Step by Step Guide to The Pickling Process

Get your fruits and vegetables ready: While certain tougher vegetables, like beets, should be boiled before pickling, others, like asparagus, should merely be blanched to maintain their texture. To fit your pickling jars, reduce the size and form of your vegetables. Smaller, bite-sized vegetables come in a variety of shapes, including thin discs, spears, and whole vegetables.

Season your vegetables with salt and pepper before serving: Season the vegetables with your favorite seasonings and herbs, leaving enough headroom for the brine, and season with your preferred seasonings and herbs, experimenting with flavors to produce unique batches. For each standard-sized jar, 1/2 teaspoon of each spice and a few sprigs of herbs should suffice.

Prepare your brine: Though the amount of sugar and salt in each brine will vary depending on the flavor you want to achieve, a general rule for pickle brine is to use equal parts water and vinegar. You can then adjust the sweetness, saltiness, and bitterness of your dish as desired.

Cook with the lid on: To dissolve the salt and sugar, put the vinegar, water, sugar, and salt in a pot and bring to a boil, stirring frequently. Allow 2 minutes to boil before turning off the heat. Fill the boiling brine into the pre-seasoned pickle jars until the liquid has completely covered the vegetables.

We're going to keep things easy since this is a novice's guide to pickling, so let's do it step by step.

Choose Your Vegetables

It is strongly advised you start by visualizing what you would like to see on the plate rather than worrying about pickling.

It's also motivating to think beyond the vegetable box. Consider those pink

pearl pickled onions or that bright purple cabbage. Capsicums, Purple cabbage, chillies, green beans, carrots, green tomatoes, and radishes are more options.

Clean & Properly Care for Your Glass Jars

Whether you're purchasing new glass containers or recycling old ones, you'll need to thoroughly clean them before sterilizing them. Pickling jars must be sterilized to prevent the pickles from spoiling due to the growth of harmful germs. To sterilize the jars, heat them to the level where no bacteria can live. It's better to disinfect them just before you pickle them.

While the pickling process is enjoyable, the sterilizing step is laborious and time-consuming, yet it is necessary. Before using any spoons, or other utensils, ensure sure they are sterilized.

The Oven Technique is one approach to sterilize the jars.

As you are pickling in jars that have rubber seals, you'll need to take them off before putting them in the oven. Preheat the oven to 130 degrees Celsius (not higher than this). Wash the lids & jars in super-hot soapy water, wash them (do not dry them), and place them on a baking sheet coated with baking paper. Immerse the lids in boiling water for 5 to 10 minutes while the jars bake for 15 to 20 minutes. Remove the jars off the jar rack and put them on the clean kitchen counter. The jars need to chill to room temperature first. If you're placing hot jams into jars, you should do it while they're still hot. You risk breaking the jars if you put cold components in hot jars.

The Method of the Microwave

Pickling jars may also be sterilized in the microwave, which is really the quickest way. All you have to do is microwave the clean jars for 45 seconds. Start by rinsing them in hot water and leaving them somewhat damp. Clearly,

you cannot microwave the jars' metal lids or tops. Pickling requires allowing the jars to cool on the counter,

Get The Vegetables Ready

Clean the veggies well in water that is safe to consume. Clean your veggies thoroughly. Some veggies must be blanched, while others must be cooked. You must also choose how to store them: whole veggies, thick coin-shaped pieces cut lengthwise, or thinly sliced matchsticks.

Choose Your Aromatic Ingredients

Salt is required, and pure sea salt is required. Experts suggest using 20 to 40g of sea salt on each liter of water, or approximately two teaspoons. But after that, it's entirely up to you what you put in the solution with your veggies. You'll need to follow a recipe for the first few times.

Get the Brine Ready

You will need equal parts vinegar and water for a simple, fast pickle. Boil the water and add the salt to make the brine, then it comes to room temperature.

Get The Pickle Jar Ready

Fill the sterilized jar(s) to the brim with the veggies, then add the aromatics, and finally the brine. Place a vine leaf or cabbage leaf on top to prevent your veggies from rising to the surface and being exposed to air, as well as keeping your pickles crisp.

Store Your Jars After Sealing Them

Just put a lid on securely and chill the jar for a few days' worth's of pickles. They'll be done in an hour, but one can leave them for several days. The longer you keep the pickles sealed in the jar in the fridge, the stronger flavors you'll get. If you want prolonged fresh pickles or fridge pickles, keep an eye

on the jars and remove the lids every several days to enable the bacteria to start the fermentation and Carbon dioxide build-up within. When the brine starts to cloud, periodically open the jar, then chill the jar for 1-2 weeks, at which point the pickles will begin to mature fully.

You can also do the water bath canning as the recipe states to store them for longer. Jars should be kept in a cold, dry, dark location for up to a year.

Storing & Rehydrating

Keeping Dehydrated Foods Safe and Rehydrating Them

Protect the dehydrated foods from warmth, light, and humidity during storage. If any of these are present in excess, the food's shelf life may be shortened. Allow the food to cool to room temp after dehydrating it to prevent moisture within the container.

When packaging dried goods for storage, consider using a vacuum sealer for the best results. If you don't have access to a vacuum sealer, you may use a Ziploc bag, but be sure to squeeze out as much air as possible and seal it securely.

Place the dehydrated food in a dark, cold, and dry location after it has been bagged. If you put it in the freezer, ice crystals will form. Check the food regularly for a couple of initial weeks to verify general quality. Foods may survive up to 20 years if properly dehydrated and kept in a vacuum seal.

If you want to rehydrate, add 1 cup of dehydrated food to 1 cup of cold or hot water, let it rest for Allow up to 4 hours for rehydration.

Use in the recipe as you usually would. If you're making the meal in a slow cooker, all you have to do is put the dehydrated foods to the cooker, add the quantity of water the recipe asks for, and the food will rehydrate itself.

Benefits of Fermentation

Health

First and foremost, let us take a look into the science of fermentation, and how it is beneficial for the human body. It is common knowledge that microbes and bacteria can be good as well as bad. In truth, the human body has evolved over millions of years in the company of microbes, and hence, has established a harmonious connection with them. In fact, there are approximately 10 trillion cells in the human body, but our bodies have almost 10 times that number of bacterial cells!

Microbes occupy almost every part of our bodies, except muscle tissues, the brain, and blood. They are abundant everywhere else. While it may seem disturbing to have all of these organisms on us and inside of us, they are vital for life! They provide us with vitamins and minerals; they create an environment unsuitable to harmful microbes by basically taking over all the nutrients or altering the environment; they regulate the functions of our digestive tracts, and help to fortify our immune systems.

The immune system has one of the most complex process of triggers, responses, chemicals, and signals in our bodies. We are being constantly attacked by microbes looking for a new host to proliferate in. They attack via air, food, and water. They are devious and will set themselves up anywhere they can find a suitable environment. For that reason, our friendly microbes act as impediments to harmful microbes.

Microbes

Since this book focuses on food, we should discuss the major microbes in our digestive systems. Our intestines host the most widespread populations of microbes in the body. They are divided into four groups, but the intestinal

microbes serve as more than just guards: they also play very important roles in our daily lives.

The four main types of intestinal microbes are:

- Bifidobacteria
- Lactobacilli
- Ingested microbes
- Fungi

The first two groups are vital for good health, while the ingested microbes are usually harmful. And the fungi, like yeast and mold, can be beneficial or harmful, depending on their numbers and strains.

Bifidobacteria consists of around thirty species found widely in the digestive system (as well as other places). They help thwart pathological (harmful) bacteria from colonizing the gut. They also regulate and strengthen the immune system. Many fermented foods are rich in Bifidobacteria, and hence, great for health. Additionally, fermentation has also been shown to terminate or decrease certain compounds that are injurious to our health, including pesticide residue.

Flavor

One major reason to ferment vegetables is instantly evident with your first bite: the taste! Fermentation lives in a kingdom of food science that can seem like magic. These flavors are difficult, if not impossible, to duplicate without fermentation. That is one reason why great chefs all over the world love fermentation.

Fun and Ease

Fermentation is for everyone. You don't need to be a professional cook to make fermented vegetables, although the flavors that this process creates will

have your friends and family thinking that you are. If you can slice a vegetable, you can ferment it. Follow just a few basic and flexible guidelines, and you'll have never ending fun fermenting vegetables to your heart and gut's content.

/Improves Gut Health

The first and most important benefit of fermented foods is that they support the gut microbiome. Many studies have been conducted to understand how the gut is affected by the consumption of fermented foods. Kefir is a fermented milk product that increases the concentration of friendly bacteria like Lactococcus, Lactobacillus, and Bifidobacteria in the gut, thus benefiting it. The consumption of tempeh will increase the concentration of Akkermansia muciniphila. It also increases immunoglobulin A levels, which is important for immune response in the intestines. Chocolate supplies prebiotic fibers and short-chain fatty acids that support beneficial microbes in the gut as well.

Better Bowel Regulation

Healthy bowel movements are a crucial aspect of good health. Including fermented foods in your regular diet will support digestion and bowel regulation. Kefir is known to improve stool frequency and consistency in people with chronic constipation. Yogurt is also helpful when dealing with constipation that is caused by slow intestinal digestion. Certain foods are easier to digest when fermented. For instance, if you consume sourdough bread instead of non-fermented bread, you will see reduced gas production, less bloating, and less abdominal discomfort.

Easier Weight Management

Fermented foods help with weight management. Kimchi does this by

affecting the genes that are involved in fat cell creation. Yogurt consumption has long been linked to lower BMI and fat percentage in the body. Many nutritionists suggest fermented food for people suffering from obesity or those who are overweight. Fermented foods also tend to be high in dietary fiber, which keeps you feeling full for a longer time. They don't contain too much sugar or cholesterol, and they can be consumed in larger amounts without worrying about gaining weight.

Better Mental Health

The gut is linked to your mental health, and fermented foods have a beneficial effect on both. When there is an imbalance in the gut microbiome, it affects mental health disorders like depression or anxiety. This is because gut dysbiosis may trigger an inflammatory response. By reducing the levels of such inflammatory microbes, fermented foods support mental health. They also increase the bioavailability of phenolic plant compounds that will modulate neurotransmission. Probiotics have a beneficial effect on the gut-brain axis too.

Antimicrobial Properties

Fermented foods supply the gut with a better concentration of friendly bacteria and also have antimicrobial effects that reduce undesirable bacteria. These antimicrobial properties help in fighting against pathogenic and opportunistic microbes in the gut. Kefir grains also have antibacterial and antifungal properties that fight against common pathogens like *Salmonella typhi*, *Salmonella enterica*, *Shigella sonnei*, and *Candida Albicans*. In the *Helicobacter pylori* infection, kefir can be consumed as an added defense along with antibiotics. The growth of *Helicobacter pylori*, *Campylobacter jejuni*, and *Salmonella typhimurium* is also inhibited by kombucha consumption. Regular consumption of yogurt introduces lactic acid-

producing bacteria that have antimicrobial properties in the gut.

Improves Cognitive Function

Some research suggests that fermented foods may help in improving cognitive function. A study done on mice showed that *Lactobacillus pentosus* inhibits drug-induced memory impairment. This probiotic is present in kimchi. Another human trial done with functional MRI showed that the consumption of fermented milk products modulates brain activity.

Boosts the Nutritional Value of Food

Fermentation affects the nutrient content of food. It reduces antinutrients that diminish or stop the absorption of beneficial nutrients in the body. Fermented foods will boost the supply of healthy micronutrients instead. For instance, phytic acid is an antinutrient that reduces mineral absorption. Fermented grain and soybean products will provide microbial phytase that catalyzes phytic acid breakdown and prevent the negative effect on mineral absorption. Sourdough is a fermented food that promotes gluten breakdown and makes it easier to digest for those sensitive to gluten. Beta-galactosidase in kefir reduces the lactose content in it. Fermented foods increase the bioavailability of nutrients like iron, B vitamins, calcium, and zinc by promoting the breakdown of substances that otherwise inhibit their absorption. They also increase dairy product acidity, transforming micronutrients like calcium in these dairy products into bioavailable forms. Specific vitamins like vitamin K2 are synthesized by fermented foods too.

Stronger Bones

For better bone health, fermented milk products are a great option. These products tend to be rich in protein, calcium, vitamin D, phosphorus, and vitamin K2. All of these nutrients are crucial for stronger bones in the body.

Studies show that the consumption of kefir helps in bone turnover and better bone mineral density. Fermented milk products may also protect against bone loss that is linked to estrogen deficiency. This may be beneficial for post-menopausal women.

Improved Cardiometabolic Health

Cardiometabolic risk is increased by insulin resistance, hypertension, high triglyceride levels, and many other factors. These factors increase the risk of diabetes type 2, strokes, or cardiovascular disease. Most research suggests that these risk factors may be reduced by increased consumption of fermented foods. Kefir can support healthy blood pressure in a way similar to drugs used for relaxing blood vessels. Adding kimchi as a side dish to each meal for a few months can help lose abdominal fat and reduce body mass index. Insulin resistance is also reduced. Kombucha can help lower blood lipids and blood sugar, thus lowering the risk of fatty liver disease not linked to alcoholism. The risk of blood clots is reduced by consuming natto. Fermented foods help maintain healthy cholesterol levels without having to depend on medication. Tempeh is particularly helpful in this since it provides protein, vitamin B, and fiber that reduce cholesterol build-up in your blood vessels. Studies show that people who consume tempeh regularly have a lower risk of high cholesterol issues.

Cell Growth Regulation

Some preliminary research suggests that fermented foods help with cell growth regulation. This may help in reducing the risk or spread of cancer in the body. In vitro studies have also shown that kombucha has a toxic effect on cancer cells in the colon. Kombucha consumption may help in preserving the normal epithelial cells in the colon. Certain kimchi-based probiotics can also help in fighting the formation of cancer cells. Consumption of fermented

beet juice can inhibit intestinal crypt formation that is considered an early symptom of intestinal cancer.

Immunity Boost and Reduced Inflammation

Fermented foods have a positive impact on the immune system and can reduce inflammation. Kefir has a probiotic bacterium that has an inhibitory effect on immunoglobulin E production. This molecule takes part in allergic responses. A sugar in kefir called kefiran can help prevent allergies since it suppresses mast cell degranulation. Women who consume fermented foods during their pregnancy can help prevent atopic dermatitis in their children.

Healthier Skin

A healthy gut is reflected in healthy skin. By improving the gut microbiome and reducing inflammation, fermented foods benefit the skin as well. People with acne may benefit from consuming fermented dairy products instead of non-fermented variants. This is because fermentation will reduce insulin-like growth factor 1, responsible for sebum production and inflammation. These foods modulate the gut skin axis and can benefit the skin due to this.

Protection From Toxins

Promising studies have shown that fermented foods may enhance the ability to detoxify. Lactobacillus is a common species in fermented foods, and it can bind heavy metals and help remove them from the body. Sauerkraut and similar fermented foods contain L. rhamnosus that reduces organophosphate absorption in the gut. The levels of mycotoxins in foods like grains can also be reduced through fermentation. Daily consumption of such fermented foods will help fortify the body against environmental toxins and help cleanse the body.

Increased Energy Levels

For higher quality of life, you need to be healthy and have high levels of energy. If you feel sluggish or lazy, it affects everything that you do. Processed and packaged foods tend to be high in hidden sugars and other additives that leave you feeling tired and lethargic halfway through your day. Fermented foods may help in maintaining higher energy levels. Kombucha is one example of fermented food that is recommended for increasing energy. It has several nutrients like vitamin B that will decrease energy combating factors.

Better Food Absorption

The body needs to be able to absorb important nutrients from the food you consume. However, many factors may affect this. Nutritionists suggest that fermented foods can help in encouraging better food absorption in the body. In particular, foods like tempeh, miso, and kefir will help your body absorb the vitamins and minerals from the other foods you consume. This is why these are regularly consumed as side dishes during meals in Korean and Japanese cuisines.

Preservation of Food

Most of us waste food regularly. We either buy too many vegetables or cook more than we can consume. This food changes when you leave it out on the counter or in your fridge for too long. You will notice that it looks withered or moldy. The food may look like it has melted or gathered colorful mold on its surface. You will also notice a strong unpleasant smell. Once the food is spoiled, you notice these signs and the awful smell. Fermented food smells quite strong as well, but it is not the same as rotten food. Fermentation is a point of balance between the food being spoiled and being preserved. It allows the good microbes to survive and the bad ones to be removed or killed. If you can carry out the process correctly, you preserve the food and

are left with something edible that lasts longer than its original form. Salt often plays a significant role in it since it destroys microbes that usually cause the food to rot or spoil. This allows healthy microbes to thrive in your fermented food, and you can preserve your food for longer.

Chapter 3: The Process of Fermentation

Food Fermentation isn't rocket science. You don't need to have a food fermentation factory to do so, and you also don't need lots of cash just to be able to ferment food. In fact, you can do it in the comforts of your own home and that's one of the best things about it.

So, how exactly can you ferment food? What are the basic ways of doing so? Here's what you need to know:

Choose your equipment. Of course, before you start the process of food fermentation, you should first have the right equipment with you. Mason Jars are definitely needed, as well as good kinds of knives that you can use to prepare the vegetables. Most of the equipment that you may need are as follows:

Fermenting Vessel. This is where you'll place those vegetables or condiments. It's a general rule that cylindrical-shaped containers are better than other shapes because it's easier to ferment in them. Examples of Fermenting Vessels include:

- Ceramic Crocks
- Ceramic Fermenting Crocks
- Canning Jars
- Slow Cooker Inserts
- Mason/Glass Jars
- Ceramic or Glass Bowls
- Glass Jars with Airlock Systems

Weights and Covers. You also need equipment that will cover the food for you and this always depends on what food you'll be fermenting. For example, Vegetables in brine are required to have weight and cover systems, whereas vegetables, fruits, and condiments without brine can be prepared

simply by just placing a lid on the container and waiting for them to be fermented. Examples of Weights and Covers include:

- Ceramic Fermentation Weights
- Heavy Glass
- Ceramic Coasters
- Small jars
- Small plates

Method of Preparation. Next, you should also decide on which method of preparation you'll use to ferment the food that you have on hand. This differs based on the ingredients that you have with you and you have to know which method is best suited for what you have with you. Some of these methods are:

Chopping. When you chop vegetables or fruits, you have to be sure that they'll be in bite-sized pieces, so you can easily eat them right away.

Examples of vegetables that you can chop include summer squash, cucumber, peppers, green beans, asparagus, eggplant, and carrots.

Grating. Grated fruits or vegetables are very smooth and come only in extremely small but somewhat lengthy pieces. You can either do this by hand or with the help of a food processor. Usually, these are done for those that you want to make as relish or sides. Examples include cabbage, zucchini, cucumber, beets, turnips, radish and carrot.

Slicing. Slicing fruits or vegetables increases surface area and is best done for Sauerkraut and those fruits or vegetables that you'll soak in the brine. They also make culturing time faster. Examples include celery, peppers, zucchini, cucumbers, and cabbage.

Culturing. Culturing, or the use of whey, salt, and other kinds of starters is

the act of choosing which starter culture is best for whatever it is that you want to make. Oftentimes, they determine the length of time for those foods to be fermented and you need starter cultures to inhibit the growth of undesirable bacteria or organisms that may stall the fermentation process.

Examples of starter cultures include:

Salt. Salt has always been the classic culture for fermenting food and it has been used even before refrigeration was around. Salt pulls undesired bacteria away and takes moisture out of the food that you're preparing so that it will last for a long time. It also suppresses the growth of organisms that you don't actually need. 1 to 3 Tablespoons of salt for every quart of water is the recommended ratio.

Fermented Juice. Basically, this is the juice or the liquid taken from food that you have fermented earlier. You just have to add around $\frac{1}{4}$ cup of it to the new mixture, together with salt brine to make fermentation easier.

Whey. Whey is kind of tricky because it may work for others but may not work for the rest. If you're going to use whey, make sure that it tastes fresh and that it has been strained properly. Whey's great though, in the sense that it keeps the natural crunchiness of vegetables intact.

Water Source. It's a given fact that you need brine to ferment most types of food, but where exactly should the water you'll use come from? Here are some water sources that you can choose from:

Tap Water. Basically, tap water is water that comes out of the faucet. It can either be mineral-rich or on the other hand, it could also be free of any minerals. You may have to run this through a water softener first just to make sure that it's safe.

Spring Water. Spring water usually comes in bottles but is originally from the

ground—which makes it rich in minerals and makes it healthy!

Distilled Water. Distilled Water contains no minerals and has been thoroughly purified. You can usually buy this from your water supply store or from the supermarket.

Bottled Water. This can either be mineral water, spring or distilled. Just check the label to be sure what of it is.

Keeping them safe. When you're trying to ferment vegetables, you want to be sure that they stay in place so that the fermentation process won't be interrupted. Some of the things that you can use to keep them safe are:

A small dish. Put a small dish on top of the vegetables and make sure that brine covers it as well. Then, place another small heavy item on top of the dish to keep it even safer.

Cabbage or Kale leaf. Actually, any strong piece of a vegetable leaf will do. Just tuck it on top of the vegetables and it will already be able to keep the vegetables in place. Carrot or Zucchini strips can work, too.

Ceramic Fermentation Weights. These are basically made for the process of fermentation so you can never go wrong with them.

Glass Stones. You know, those stones that you usually use to decorate the aquarium or your floral arrangements with—they are these stones. Make sure though that they're really clean before you put them on top of the vegetables. Choose ones that are over 2 inches in diameter so you won't have a hard time.

Fermenting in a bowl before transferring to jars. If you can't make use of the methods given above, it's also okay to ferment the vegetables in a bowl first then just use a large plate to press them down. Once they're done or are fully submerged, move them to the storage jars together with their brine.

Ready for the move. Finally, once you have done all the techniques above, it's time for the vegetables to be transferred into cold storage. However, this may be tricky because not everyone knows if the food's actually ready to be moved or not. Well, here are some signs that will allow you to know if you can already transfer the vegetables to cold storage:

The Smell. It's true that you'll know whether a food is good or not through its aroma. Well, you'll also know whether a food is already close to being fermented or not by means of smelling it and by the aroma that it emits. If your fermented food is ready, it should have this vinegary-sour smell. At first, the smell may be too strong, then you'll notice that it will subside after a couple of seconds or so. However, when you think that it smells rotten, chances are it probably is, so just throw it away and start all over again.

Bubbles. Seeing bubbles in your fermented foods are also normal because it means that lactic acid has been formed and that the vegetables are being cultured. Take note though, that the amount and size of bubbles will differ for each food product so know that even though zucchini has more bubbles than tomatoes, there's no problem with it.

Flavor. And of course, the flavor is very important, too. Now, when you've smelled that sour smell and when you've seen the bubbles, you should get on to taste what you have made. Once you notice that it's already flavorful or tangy, especially for pickles, you can then transfer them to cold storage. Congratulations!

And, beware of molds. As you're going to ferment these fruits and vegetables, you should also be aware that molds may form, and once they do, you have to discard what you have made and just begin again. Molds usually appear because of a variety of things and some of them are:

The Quality of Fruits and Vegetables. Of course, when you see that the fruits

and vegetables you have on hand are about to decay, why in the world would you still use them? That's just like you're inviting molds to invade them!

The amount of salt. 1 to 3 Tablespoons of salt per quart of water is good, but anything more (or less) than that may just bring on bad bacteria and molds, so always be aware of how much salt you're putting in.

Vegetable Submersion. You can prevent molds from infesting your vegetables if you actually submerge them well in water and if you won't allow oxygen to come in contact with them while they're in the fermenting vessel.

The Temperature. It's best to ferment food in a cool place because this will prevent molds from being around, and it'll also make the whole process faster and easier. 65 to 70F is recommended.

Steps

Preparation

There are certain preparations like sterilizing the lids and jars that you need to do beforehand. But this step is unnecessary if you need to process the jar for more or less ten minutes.

After doing all the washing and sterilizing, prepare the water bath canner. It will help if you keep a stand-by kettle filled with boiling water for filling the canner quickly if needed.

The water should be brought to a boil to 140 F for raw packing. For hot packing, the boiling temperature should be 180 F.

Fill Food in The Jars

Always check the jars and lids for any imperfections like cracks. Use a perfect jar and new lids for canning with no chips or cracks. It would be best to give the jar a run in the dishwasher. Now, swiftly fill the canning jar using a ladle. When the jar is filled, stir the food using a chopstick or spatula. This step ensures that there is no air bubble trapped inside the jar.

Shut Off The Jars

All the jars have round lids specific for canning. You should place them accurately on the mouth of the jar and secure them with a lid wand. Keep screwing the bands unless the lids are airtight. Ensure that they are not too tight as the air needs to escape from the jar during processing.

Processing The Jar

Take a jar lifter and start lifting the jars one by one. You should lower each jar into the water canner. This step requires care as the position of the jar should always be vertical in the water bath. The water level should be one

inch high from the top of the jar, and jars should be half inches apart.

Now turn on the heat and let the water come to a full boil. Close the pot with a lid and let the jars process until the timer rings according to your set time.

Cooling The Jars

You should start lifting the jars from the water vertically and put them outside on the shelf. But there should always be cooling towels or a rack for putting the jar in. The jars should be at a distance of one inch from each other. Allow the jars to cool for almost 12 to 14 hours.

Store The Jars

After the jars have cooled down, check whether they are shut tightly. Press down your finger on the lid to check the seal of the jar. If they are not sealed properly, the jars will wiggle.

Now you should start removing the rings from the jars. If you can lift the jar from the lid, there is no need to worry about proper sealing. Now wipe the jars with a clean moist cloth. You should store the jars in a dark and cool place.

The big three types of fermentation

We'll go through each type in turn, then show you a chart with the relevant information for all the visual learners out there.

- Lactic acid fermentation.
- Ethanol fermentation, otherwise known as alcohol fermentation.
- Acetic acid fermentation.

Lactic Acid Fermentation

First, let's talk about lactic acid fermentation. You may remember this being mentioned when we were discussing pickling, and for good reason. Every preservation technique, from pickling and fermentation to refrigeration, curing, smoking, vacuum sealing, and even cooking all have the same goal. This goal is to create an environment that is inhospitable to any of those nasty microbes that make you sick and that make your food unpalatable.

So, we know that pickling creates an environment that is too acidic for harmful microbes to thrive. Lactic acid fermentation does this too; it just takes a little longer to get to that point. This process is anaerobic, meaning that it doesn't need any oxygen to occur. It also doesn't need any heat to work, although temperatures that are too cold will greatly slow the process down, and too high temperatures can kill the bacteria.

Once the bacteria and yeast strains that are used in lactic acid fermentation get where they need to be, they start by using a process called glycolysis² to break down each glucose molecule found in carbohydrates into two smaller molecules, called pyruvates. This is a process that all cells go through in order to extract energy from glucose, including the cells in our body. In anaerobic conditions, the microbe then converts these pyruvate molecules into lactic acid. Technically, the lactic acid is a byproduct of the cell trying to

create more energy, but that's the part that we're after. Also, this isn't a science textbook and we're already pushing it.

So, once enough of this lactic acid is produced, it creates an environment that is too acidic for harmful microbes to survive and keeps your food safe. It also produces carbon dioxide, which creates bubbles and allows you to see just how well the fermentation is doing. Don't worry, it's much simpler in practice. All you need to do is get the right microbes in there and let them do their job.

Lactic acid fermentation is what many of us are most familiar with. This is what we use to produce all the more familiar fermented goodies, such as sauerkraut, kimchi, and yogurt. Pretty much every fermented pickle also uses this method, simply using lactic acid produced during fermentation in the place of acid that's been directly added to the mix.

Alcohol Fermentation

Alcohol fermentation is a similar process to lactic acid fermentation, but with a different end product. It starts the same way, where the helpful microbe breaks down glucose into pyruvate molecules in an anaerobic environment. But rather than convert these molecules into lactic acid and carbon dioxide, the microbe converts them into ethanol and carbon dioxide.

Predictably, this method is typically used to produce alcoholic beverages. The end result depends partially on the type of yeast used, but primarily on the initial subject of fermentation.

Acetic Acid Fermentation

Now, this kind of fermentation is a little bit different. While lactic acid fermentation and ethanol fermentation are both anaerobic processes (without oxygen), acetic acid fermentation is an aerobic process involving oxygen³.

The microbes responsible for this kind of fermentation are imaginatively named acetic acid bacteria, but they usually aren't alone. These bacteria form a symbiotic relationship with yeast to create a visible colony. The colony basically just looks like a blob. The specific bacteria and yeast within the colony change according to the environment and what you're trying to make. For example, it's known as a "mother" when it is used to produce vinegar, but kombucha has a "SCOBY" (symbiotic culture of bacteria and yeast) instead. These colonies are similar but not identical. You can theoretically use a vinegar mother to make kombucha, but you'll need to give it more time and some attention to make sure that it lives long enough to adjust to the change in environment.

Anyway, as this fermentation is primarily an aerobic process, it works by oxidizing any ethanol, carbohydrates, and sugar alcohol that the bacteria come into contact with. Most importantly, this bacteria converts ethanol into organic acids, which is how vinegar is produced from alcohol. While vinegar makers like this bacteria and aim to promote it, acetic acid bacteria are the bane of alcohol producers, as they have to fight against it to prevent their product from souring. This acidity, in turn, makes the environment less hospitable to other microbes, a process we're surely familiar with by now. The speed of the fermentation process depends on a few factors, including the amount of oxygen present.

Primary and secondary fermentation

Primary Fermentation. This is a relatively quick phase where the microbes begin to rapidly break down raw fruit, vegetables, or whatever else you're fermenting. These microbes prevent bad microbes from colonizing the food, all while converting carbohydrates into either alcohol or acids. Many fermentation projects will end here.

Secondary Fermentation. This phase takes much longer, stretching into weeks. At this point, alcohol levels rise, and the carbohydrates that feed the microbes become harder to come by. This starts to kill off the yeasts and microbes, although some will switch to more complex sugars. The pH of the ferment changes as well, and once the alcohol is at a certain point, all the yeast will die off, and the fermentation will end.

The secondary fermentation is mostly used to produce different types of alcoholic beverages and typically occurs in a different vessel than the primary fermentation. For sparkling wine, this is where the bubbles come from, as they're produced in the bottle during this fermentation. Different types of alcohol require different fermentation lengths, but this is where some of the more complex and heavier flavors come into the picture.

See, that wasn't so bad, was it? Now we're almost ready to get our fermentation journey started, but there are a few quick tips to keep in mind before we get going.

Quickfire fermentation tips

Starter Cultures. Yes, one thing you may be wondering is, “how do I make sure my ferments cultivate the right microbes?” One way is by creating an environment that will be inhospitable to other microbes, but there’s a much faster and more reliable way as well. Introduce a starter culture. A starter culture is just that, a culture of microorganisms that will allow you to start a fermentation process quickly and reliably. They make the sometimes murky work of fermentation far more predictable, as you know exactly what microbes are in your project. You can buy starter cultures, and common ones include brewer’s yeast, vinegar mothers, kombucha SCOBYs, and kefir grains.

Keep Everything Clean. Another important way to keep nasty microbes out is to keep everything as clean as possible. Yes, you want bacteria in there, but you only want specific bacteria. Until the fermentation process is underway, cleanliness is your only line of defense against the bad microbes. So, be vigilant.

Avoid Air Exposure. In a similar vein, keep everything away from air as much as possible. This doesn’t mean sealing the container, as that doesn’t mix well with carbon dioxide production, but it does mean keeping your fermentation subject submerged in liquid. Most fermentation is an anaerobic process and takes place in an environment hostile to bad microbes, so letting a little bit of veg poke out into the air is like giving harmful bacteria a welcoming mat to your fermentation project. I can’t stress it enough, keep it submerged.

Store in a Designated, Temperature Controlled Place. This doesn’t have to be too complicated; just find a secure place with a consistent temperature that you can monitor. For most projects, this will be around 70°F, which happens

to be ordinary room temperature. Brewing yeast prefers slightly higher temperatures closer to 90°F, so bear that in mind when experimenting with beer. If the temperature is too high, your microbes might die off. If it's too low, then the fermentation process will be slower.

Use the Best Ingredients You Can. This means fresh produce, as something that's already started to decay, makes a poor fermentation subject. Use filtered or distilled water, as tap water may have additives. Finally, use unrefined, mineral-rich salt. Not only does this have more nutritional benefits, but you will know that the salt has no additives that may interfere with the fermentation. Sea salt or good rock salt will do just fine.

Burp Your Ferments. Remember, these processes produce carbon dioxide, so you need to let the gas escape. Open the container every day or so, depending on the speed of the fermentation, and you'll avoid any mishaps.

Getting your fermentation on

So, we've got ourselves primed for some good old fermentation projects; now we just need to get our kitchen ready. Don't fret; this part is easy. Honest.

You'll be pleased to know that I like to think as minimally as possible when it comes to stocking my kitchen. Yes, those flashy kitchen tools with only one purpose sure do look tempting, but they're expensive and take up precious space. I've made enough mistakes along those lines, and I refuse to do that to you. Everything recommended here has multiple uses, and to be honest, you probably already have most of it.

A Sharp Knife. I desperately hope you already have a knife. Keep it sharp; it's both nicer to use and safer than a blunt knife. Pick one that suits you; most people find chef's knives to be good all-rounders.

Glass or Stainless Steel Bowls. These bowls are incredibly useful and non-reactive, making them perfect for fermentation. Many ferments require you to massage your vegetables (it makes sense in context), so roomy bowls are ideal.

Glass Jars. I like 1 Quart and 1 Gallon jars, as you'll probably be fermenting quite large quantities of food, and it's easier to fit your hand in to pack the vegetables as tightly as possible. You can use ceramic crock or food-grade plastic containers, but it's far easier to see what's going on in a glass jar. Also, it looks pretty.

Tea Towels/Cheesecloth. You likely already have tea towels, at least, but cheesecloth is useful for more than just cheese and is easily worth having in the kitchen. These will keep dust, bugs, and other debris away from your ferment.

Weights, Gates, or Springs. Remember when I kept stressing that you should keep your fermenting food submerged? Well, here I go again. Unfortunately, some pesky vegetables or fruit have an irritating tendency to float. You can weigh them down with clean, food-safe weights to keep them submerged. Otherwise, you can use a device known as a “gate” that is locked into the neck of the jar. This prevents the ferment from moving upwards. Finally, a spring is just that, a stainless steel coiled spring that pushes your ferment underneath the brine. You can use whichever method that works for you.

Digital Scale. Yes, weighted scales look nice, but digital scales allow you to get a far more accurate reading. They’re also more convenient, as you can weigh ingredients in the bowl or container you’ll be using.

Instant Read Thermometer. As with the digital scale, an instant-read thermometer will give you an accurate reading. Even better, it’s instant, so you don’t have to stand there and wait for your temperature reading.

For sourdough, get a dutch oven. Dutch ovens are great tools in general, but they’re especially important for sourdough because they mimic commercial steam ovens. They trap the steam while the dough cooks, which helps to create the perfect crust.

When it comes to making alcohol, you will need some extra equipment.

Tubing and Siphons. These make moving your liquid between containers far easier and ensure that you get your delicious alcohol where you want it, rather than all over the floor or yourself.

Airlocks. Airlocks allow the CO₂ to escape the container while keeping the whole fermenting environment completely sterile. You can get cylindrical airlocks or s-shaped airlocks. They’re very important for alcoholic ferments. If you have a few extra, you can also use them with lactic acid ferments, as it

means that you don't have to burp the jar.

Hydrometer. This is a device that measures the approximate alcohol level of your beverage. It does this by comparing the amount of sugar before fermenting to the amount after the process is complete, so you can see how much has been converted. If you want to know just how alcoholic your brew is, then one of these is a must.

Food-Grade Bucket. This will provide you with a roomy, relatively inexpensive fermenting container. Keep it clean and sterile, and you're ready to go.

Fine Mesh Strainer. This will help you to filter out any solids from your brew. So, this could be fruit, wood chips, or whatever else you put in there that you don't want in your drink.

As you can see, you don't need an insane amount of complex equipment for most fermenting jobs. Most of you could probably get started right away. Technically, you could ferment alcohol with a bucket, yeast, and sugar, but I'm assuming that you'd prefer a beverage that tastes halfway decent. The equipment makes the whole process easier and safer and will end in a better product.

Why Fermented Foods Are Good for You

You may be wondering why fermented foods are good for you. The answer is bioactive compounds. The probiotic content in fermented foods is usually responsible for all their benefits. Not every fermented food contains viable probiotics. Despite this, even fermented foods that lack those probiotics are beneficial for your health because of the various bioactive compounds found in fermented foods.

Bioactive Peptides

Bioactive peptides are produced by certain lactic acid-producing bacteria that are present in fermented foods. These bioactive peptides are small organic molecules that are joined by peptide bonds. Some bioactive peptides like bacteriocins are antimicrobial in nature.

Phenolic Compounds

These are small molecules that have a ring-shaped chemical group called phenol. Polyphenols are phenolic compounds present in blueberries, blackberries, and other colorful fruits. Fermentation increases some phenolic compounds with antioxidant properties that also balance the microbiome in the gut.

Prebiotics and Micronutrients

Fermented foods act as a bioavailable delivery system for micronutrients and prebiotics like calcium.

Easier Digestibility

Compounds that are usually difficult to digest for the body are broken down through fermentation. This includes FODMAPs in grains, vegetables, and legumes, as well as the lactose in dairy.

Points to Remember

All Fermented Foods Are Not Equal

If you want fermented foods to benefit your body, you need to consume those fermented with natural processes and probiotics. Live cultures are found in kefir, yogurt, kimchi, etc., and so you have a lot from which to choose. The pickled vegetables that you buy from the grocery store may have been pickled with vinegar. Fermented products available in packaged form are often devoid of probiotics since they aren't prepared with the natural fermentation process. To ensure that you are purchasing fermented foods with probiotics, check the label to see if it mentions "naturally fermented." When opening jars of naturally fermented foods, you will usually see some telltale bubbles. These bubbles are a sign that living organisms are present inside. Preparing your own fermented food is the best option, but the next best thing is store-bought if you can find naturally fermented products.

Moderate Consumption

When it comes to food, everything should be consumed in moderation. You don't have to cut out every food you like to lose weight or get healthy. You shouldn't be overeating something just because you enjoy it, either. Moderate consumption will allow you to enjoy your meals and maintain a healthy body. While we have mentioned numerous benefits of fermented foods, these should be consumed in moderation too. They don't harm your body but should be consumed in reasonable portions. Only then can you expect to benefit from them without worrying about the possible effects of overconsumption.

Food Safety in Fermentation

Fermentation has been becoming popular again for a good reason. The process allows you to create new flavors from the same old foods and improve your health while you do this. In fact, fermented vegetables are more digestible than in their raw forms. This is because the living bacteria in the fermented vegetables help digest other food present in your digestive tract. People have been fermenting food since ancient times, even without having access to refrigerators or stoves. They managed to do this safely, which says a lot about whether fermented foods are safe for consumption. Most of us eat some form of fermented food every day, but when you are first introduced to the concept and think about fermented foods, you assume it will be pungent and possibly dangerous food. However, your bread, coffee, chocolate, etc., are all fermented foods. Food scientists advocate for the consumption of fermented foods because they are aware of the benefits.

As long as the food is fermented correctly, there is no danger. It is important to know how to ferment the right way to avoid any mishaps. Microbiologist Fred Breidt says that fermented vegetables might be safer to consume than raw vegetables. This is because the lactic acid in fermented foods can find and kill any harmful bacteria. Lactic acid bacteria consume sugars in food and convert them to lactic acid. This lactic acid will then be able to overpower almost any other pathogen nearby. Fermentation methods are easy to follow and similar all across the world. It is hard to mess them up, and although there is a slight possibility of mistakes, it is rare.

Almost all vegetables can be fermented, and cabbage, cucumbers, turnips, radishes, etc., are particularly suited for it. Leafy greens contain high amounts of chlorophyll, and most people don't like the fermented dishes prepared from these. Another thing to keep in mind is that fermentation and pickling

overlap but are not the same. For instance, you can pickle cucumbers with or without vinegar and use salty brine instead. Vinegar and other such acids will be produced during fermentation, and this is why they have a vinegary aftertaste. There is still much research on fermentation needed, but most experts agree that the traditional fermentation methods are still as effective as before. People unfamiliar with fermentation are often scared of preparing fermented foods at home because they fear bacteria or assume that the pungent smell means the food has gone bad. But these fears will subside when you realize how common food fermentation is around the world and just how long it has been practiced safely. Sauerkraut has been a constant part of the German diet, especially in winter, since it provides vitamin C and has a high nutritional value. Humans relied on fermentation to preserve food and survive with good health even when food was scarce. The practice of fermenting foods is widespread across the world, and each place has its own fermented food recipes. Some, in particular, have found their way to different places other than their origins and became wildly popular. This book has recipes that will help you safely prepare these fermented dishes without worrying about food safety.

If you are genuinely concerned about food safety, you should know that the basics are the same as preparing any other kind of food. It is better to use vegetables or any other raw ingredient that has been grown organically. If the vegetables you use had come in contact with compost or manure, then they might still have pathogens like Salmonella or E. coli. In such cases, the raw ingredient you use will set you up for failure and harm your health even if you follow the proper fermentation process. Handling the food well and having proper sanitary practices can make a big difference. All produce should be washed thoroughly whether you buy it at a store or grow it in your garden. Wash your hands well before handling food. The surfaces on which

you prepare the dish or the utensils you use should also be clean and uncontaminated. For higher quality fermentation, use vegetables that are as fresh as possible. These should help ease your mind on any food safety issues before the preparation of any fermented foods. Handle the food with clean hands or utensils. Don't let it come in contact with any meat or fish that might be contaminated as well. Overall, fermented vegetables have been known to be safer than raw vegetables for consumption. But practicing food safety guidelines helps avoid any possibility of getting sick from fermented food preparation or consumption.

Fermentation alone cannot eliminate every possible health risk associated with food. The correct temperature is crucial. The temperature will determine how much or how little time your food needs to be fermented. For instance, sauerkraut will ferment well in approximately four weeks if the temperature is around 70 degrees. If the temperature goes above 75 degrees, it may get soft. This means that the correct temperature facilitates proper fermentation and allows harmful pathogens to be destroyed while the good microbes thrive.

Salt plays a very important role in the fermentation of foods, so it is essential to measure and add the exact amount of salt mentioned in a tried and tested recipe. Pickling or canning salt is used for fermentation, and these cannot be substituted with kosher salt or table salt. Remember to use salt without added iodine since it may inhibit the fermentation process. The amount of salt appropriate for a dish will depend on what is being fermented.

Certain foods may need nearly 13 percent of their weight in salt, while some might only need around 2.25 percent. The best way to get this right is to follow recipes that are already tested. Someone else's trials and errors will save you time. The salt content will affect the kind and amount of microbial

activity taking place while fermenting. It will also prevent your vegetables from getting too soft.

The amount of time you store the fermented food also affects its texture. The vegetables are firmer when they are kept for a shorter time. When you keep fermented food in the fridge, the fermentation rate slows down. This is why you can store fermented foods for a couple of months without their taste or quality being affected. The fermented food should be acidic enough for safe consumption, so check that the pH level is 4.6 or lower.

If the process of fermentation is carried out correctly, this acidic level will be attained easily. Temperature control and following the proper food safety precautions can help avoid any issues like botulism poisoning that bad fermented foods might cause. Using recipes created by food experts or other reputed sources is your best bet. The fermented food recipes in this book are a great way to get started. One of the easiest ways to get started is sauerkraut fermentation.

The basic procedure used for this dish can be used for fermenting many other vegetables too. The fermentation time and salt volume may vary accordingly. For vegetables like carrots that are dense, chop, grate or shred so the lactic acid can easily get inside them. The fermentation is better and safer when the surface area is more. This does not apply to cucumbers since they have a 90 percent volume of water, and the lactic acid bacteria can enter easily.

Another thing to consider when it comes to food safety is mold. A little mold on the surface can happen, and it can be easily removed. If the mold goes down into the solution or food, it increases the risk of disease. Toss out any batch where you notice excess mold formation. It is better to be careful to maintain good health than take undue risks by consuming moldy food.

If you keep all these simple points in mind, you can safely enjoy fermented

foods and improve the health of your gut and body.

Conclusion

Cultures in different parts of the world have been consuming fermented food for ages. The Germans have been eating Sauerkraut for years, while the Koreans have made Kimchi a staple in their daily diet. There are even studies that have been conducted fairly recently that show the association between our overall health and food rich in probiotics. It is sad, however, that because of the recent advances in food technology and preparation, these traditional foods have been lost in society.

Over the past decades, the number of beneficial enzymes and probiotics in our diet has made a nose-dive, as raw milk has been replaced by pasteurized milk, homemade yogurt has been replaced with pasteurized yogurt, and sauerkraut and pickles that are lacto-fermented have been replaced with vinegar-based ones, and so forth.

You can store fermented food for a long time. You can keep it for years as long as you store it in a dark and cool place. It is also essential to keep these foods in brine (a mixture of salt and water). Use the methods mentioned in the book to get started with fermenting. Once you finish the fermentation process, transfer the food to a cold storage area. You can store the food in a cold cellar or fridge, but make sure you maintain the temperature between 32 and 50 degrees. Do not use an airlock but a regular lid. The cold temperature will slow down the organisms' growth, which helps preserve the food while it continues to age. If you ferment vegetables, you can store them for a year. Consume fermented fruit within a week or a month at most to avoid alcohol formation.

It is okay to freeze any food you ferment, as well. This means the organisms stop growing altogether, which increases the shelf life of the fermented product. Make sure you double or even triple-layer the food to prevent

freezer burns. Bear in mind that you need to follow the measurements given in the book to a tee.

You will probably make some mistakes here and there, but this is normal. Learn from your mistakes and make sure you try new things. You will learn and get to the point where fermenting becomes just as easy as cooking.